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عبء العمل الرقمي، والإجهاد التقني، والرفاه النفسي لدى الموظفين في
أنظمة الرعاية الصحية الذكية في المملكة العربية السعودية

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حقوق الطباعة

تعود حقوق الطبع والنشر لهذه الرسالة إلى جامعة ميدأوشن. وتُعد جميع المواد والمحتويات الواردة في هذه الرسالة، بما في ذلك النصوص والأشكال والجداول والبيانات، ملكًا لجامعة ميدأوشن، ولا يجوز نسخها أو إعادة إنتاجها أو نشرها أو توزيعها أو استخدامها بأي وسيلة كانت، كليًا أو جزئيًا، دون الحصول على موافقة خطية مسبقة من جامعة ميدأوشن، وذلك مع مراعاة الأنظمة واللوائح المعمول بها المتعلقة بحقوق الملكية الفكرية.

المستخلص

أحدث التحول الرقمي المتسارع في قطاع الرعاية الصحية تحولاً جوهرياً في أساليب تقديم الخدمات الصحية من خلال دمج التقنيات الرقمية المتقدمة في العمليات السريرية والإدارية والتشغيلية. ورغم أن هذه التقنيات أسهمت في تعزيز كفاءة الرعاية الصحية وجودتها وتحسين نتائج المرضى، فإنها أفرزت في الوقت ذاته تحديات جديدة في بيئة العمل، من أبرزها زيادة عبء العمل الرقمي والإجهاد المرتبط باستخدام التكنولوجيا. هدفت هذه الدراسة إلى فحص العلاقات بين عبء العمل الرقمي، والإجهاد التقني، والرفاه النفسي، والدعم التنظيمي لدى العاملين في أنظمة الرعاية الصحية الذكية في المملكة العربية السعودية. وعلى وجه التحديد، تناولت الدراسة أثر عبء العمل الرقمي على الإجهاد التقني، وأثر الإجهاد التقني على الرفاه النفسي، والدور الوسيط للإجهاد التقني، بالإضافة إلى الدور المعدل للدعم التنظيمي. واستندت الدراسة إلى نظرية الإجهاد التقني (Technostress Model)، ونموذج متطلبات العمل-الموارد (JD-R Model)، ونموذج قبول التكنولوجيا (Technology Acceptance Model – TAM).

اعتمدت الدراسة المنهج الكمي باستخدام تصميم بحثي مقطعي (Cross-Sectional). وتم جمع البيانات من (200) من العاملين في القطاع الصحي باستخدام استبانة منظمة تضمنت مقاييس معتمدة لقياس عبء العمل الرقمي، والإجهاد التقني، والدعم التنظيمي، بالإضافة إلى مؤشر منظمة الصحة العالمية للرفاه النفسي (WHO-5) وقد تم تحليل البيانات باستخدام برنامج الحزمة الإحصائية للعلوم الاجتماعية (SPSS) الإصدار 29، من خلال الإحصاءات الوصفية، وتحليل الثبات، وتحليل ارتباط بيرسون، والانحدار المتعدد الهرمي.

أظهرت نتائج الدراسة أن العاملين في القطاع الصحي يعانون من مستويات مرتفعة نسبياً من عبء العمل الرقمي والإجهاد التقني، في حين جاءت مستويات الرفاه النفسي والدعم التنظيمي المدرك عند مستوى متوسط. كما بينت النتائج وجود علاقة إيجابية ذات دلالة إحصائية بين عبء العمل الرقمي والإجهاد التقني، وعلاقة سلبية ذات دلالة إحصائية بين الإجهاد التقني والرفاه النفسي. وأوضحت النتائج كذلك أن الإجهاد التقني يؤدي دوراً وسيطاً جزئياً في العلاقة بين عبء العمل الرقمي والرفاه النفسي، بينما أسهم الدعم التنظيمي في تعديل العلاقة بين عبء العمل الرقمي والإجهاد التقني بصورة جوهريّة، من خلال الحد من الآثار السلبية الناجمة عن تزايد المتطلبات الرقمية.

وخلصت الدراسة إلى أن تحقيق تحول رقمي مستدام في قطاع الرعاية الصحية بالمملكة العربية السعودية يتطلب تحقيق التوازن بين الابتكار التكنولوجي والمحافظة على رفاه العاملين. كما أكدت أهمية تعزيز الدعم التنظيمي من خلال تنمية المهارات الرقمية، وتوفير الدعم الفني، وممارسة القيادة الداعمة، وتصميم الأنظمة الرقمية بما يركز على احتياجات المستخدم، وتطبيق استراتيجيات فعالة لإدارة التغيير. ومن شأن هذه الإجراءات أن تسهم في الحد من الإجهاد التقني، وتعزيز الرفاه النفسي للعاملين، ودعم نجاح التحول الرقمي المستدام. كما تقدم الدراسة أدلة علمية وتوصيات عملية يمكن أن يستفيد منها متخذو القرار ومديرو المؤسسات الصحية في بناء بيئات عمل رقمية أكثر صحة واستدامة، بما يتوافق مع مستهدفات رؤية المملكة العربية السعودية 2030.

الكلمات المفتاحية: عبء العمل الرقمي، الإجهاد التقني، الرفاه النفسي، الدعم التنظيمي، أنظمة الرعاية الصحية الذكية، التحول الرقمي، المملكة العربية السعودية.

Abstract:

The rapid digital transformation of healthcare has fundamentally reshaped healthcare delivery by integrating advanced digital technologies into clinical, administrative, and operational processes. Although these technologies have improved healthcare efficiency, service quality, and patient outcomes, they have also introduced new workplace challenges, including increased digital workload and technology-related stress. This study examined the relationships among digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. Specifically, it investigated the effect of digital workload on technostress, the impact of technostress on psychological well-being, the mediating role of technostress, and the moderating effect of organizational support. The study was underpinned by the Technostress Model, the Job Demands–Resources (JD–R) Model, and the Technology Acceptance Model (TAM).

A quantitative cross-sectional research design was adopted. Data were collected from 200 healthcare professionals using a structured questionnaire comprising validated measures of digital workload, technostress, organizational support, and the World Health Organization Five Well-Being Index (WHO-5). The data were analyzed using SPSS Version 29 through descriptive statistics, reliability analysis, Pearson correlation, and hierarchical multiple regression.

The findings revealed relatively high levels of digital workload and technostress, whereas psychological well-being and perceived organizational support were moderate. Digital workload had a significant positive effect on technostress, while technostress had a significant negative effect on psychological well-being. Furthermore, technostress partially mediated the relationship between digital workload and psychological well-being. Organizational support significantly moderated the relationship between digital workload and technostress by reducing the adverse psychological effects associated with increasing digital demands.

The study concludes that achieving sustainable digital transformation in Saudi healthcare requires balancing technological innovation with employee well-being. Strengthening organizational support through continuous digital skills training, effective technical assistance, supportive leadership, user-centered system design, and change management strategies can reduce technostress and enhance employees' psychological well-being. The findings provide empirical evidence and practical recommendations to support healthier digital work environments and contribute to the successful implementation of Saudi Vision 2030.

Keywords: Digital Workload, Technostress, Psychological Well-Being, Organizational Support, Smart Healthcare Systems, Digital Transformation, Saudi Arabia.

شكر وتقدير

الحمد لله أولاً وآخراً، الذي بنعمته تتم الصالحات، أحمدته سبحانه وتعالى وأشكره على ما أنعم به عليّ من قوة وصبر وحكمة وتوفيق، والذي بفضلته تمكنت من إتمام هذا البحث وإكمال هذه المرحلة العلمية.

أتقدم بخالص الشكر والتقدير إلى جامعة ميدأوشن (Midocean University) على ما وفرتة من بيئة أكاديمية متميزة وإمكانات علمية ساعدتني على مواصلة دراستي وإتمام درجة الماجستير. كما أتوجه بالشكر إلى أعضاء هيئة التدريس ومشرفين البحث د. الفصيل عبد الحميد محمد و د. فايز علي جراد والإداريين على جهودهم المخلصة ودعمهم المستمر طوال مسيرتي الأكاديمية.

وأنتقدم بخالص الامتنان والعرفان إلى المشرفين على هذا البحث لما قدموه من توجيه علمي قيم، وتشجيع مستمر، وملاحظات بناءة، ونقد موضوعي، ودعم لا محدود في جميع مراحل إعداد هذه الدراسة. لقد كان لخبراتهم العلمية وصبرهم وحرصهم على التميز الأكاديمي بالغ الأثر في الارتقاء بجودة هذا البحث وإثراء تجربتي البحثية.

كما أتقدم بجزيل الشكر والتقدير إلى جميع العاملين في القطاع الصحي الذين شاركوا في هذه الدراسة، وقدموا من وقتهم وخبراتهم ما أسهم في إنجاز هذا البحث، فلولا تعاونهم لما كان من الممكن الوصول إلى هذه النتائج.

وأعرب كذلك عن بالغ امتناني لإدارة ومنسوبي الجهات الصحية المشاركة على تعاونهم وتسهيلهم إجراءات جمع البيانات، وتقديم كل ما من شأنه دعم تنفيذ هذه الدراسة.

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List of Terminology

Term	Definition
Digital Workload	The cognitive, mental, and operational effort required to perform work-related activities using digital technologies, including electronic documentation, digital communication, information processing, and interaction with multiple digital platforms.
Technostress	A form of stress experienced by individuals as a result of using information and communication technologies. It arises when employees find it difficult to cope with technological demands such as information overload, system complexity, and continuous technological change.
Psychological Well-being	A positive state of mental health in which individuals realize their abilities, cope effectively with normal life stresses, work productively, and contribute positively to their organizations and communities. In this study, it is measured using the WHO-5 Well-Being Index.
Organizational Support	Employees' perception that their organization values their contributions and cares about their well-being through leadership support, technical assistance, digital training, and adequate organizational resources.
Smart Healthcare Systems	Healthcare systems that integrate advanced digital technologies such as Electronic Health Records, Artificial Intelligence, cloud computing, telemedicine, and interconnected information systems to improve healthcare delivery, operational efficiency, and patient outcomes.
Digital Transformation	The strategic integration of digital technologies into healthcare processes and organizational practices to improve efficiency, quality of care, and organizational performance.
Mediation	A statistical process in which technostress explains the mechanism through which digital workload influences psychological well-being.

List of Abbreviations

Abbreviation Full Meaning

AI	Artificial Intelligence
EHR	Electronic Health Record
EHRs	Electronic Health Records
HIS	Hospital Information System
ICT	Information and Communication Technology
IoMT	Internet of Medical Things
JD–R	Job Demands–Resources Model
MOH	Ministry of Health
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptance Model
WHO	World Health Organization
WHO-5	World Health Organization Five Well-Being Index

Chapter 1

Introduction

1.1 Introduction

Over the past two decades, healthcare has experienced an unprecedented digital transformation driven by rapid technological innovation and the widespread adoption of digital solutions. Across the globe, healthcare organizations have increasingly integrated information and communication technologies (ICTs) into clinical, administrative, and operational activities to enhance efficiency, improve patient safety, support evidence-based decision-making, and deliver higher-quality healthcare services. Technologies such as Electronic Health Records (EHRs), Hospital Information Systems (HIS), telemedicine, clinical decision support systems, mobile health applications, artificial intelligence (AI), cloud computing, and electronic workforce management systems have become essential components of modern healthcare delivery (World Health Organization [WHO], 2021).

The adoption of these digital technologies has transformed the way healthcare professionals work. Daily clinical practice now depends heavily on digital platforms for communication, documentation, patient management, and collaboration among multidisciplinary teams. These technologies provide faster access to patient information, improve coordination between healthcare providers, reduce medical errors, and strengthen organizational accountability. As a result, digital transformation has become a strategic priority for healthcare organizations seeking to improve service quality while meeting growing demands for efficiency and sustainability (Khalifa, 2019).

Worldwide, governments continue to invest heavily in digital health infrastructure as part of broader healthcare reform strategies. Digital health is increasingly recognized as a key driver of better population health, stronger healthcare governance, improved accessibility, and more informed clinical decision-making. According to the World Health Organization (2021), digital technologies can enhance health system performance by promoting integrated care, strengthening public health surveillance, supporting patient-centered services, and facilitating evidence-based clinical practice. Consequently, healthcare organizations continue to expand the use of digital technologies across both clinical and administrative settings.

Saudi Arabia has embraced this transformation at an accelerated pace, particularly following the introduction of Saudi Vision 2030. The Vision identifies digital transformation as a fundamental pillar for improving the quality, accessibility, and sustainability of healthcare services throughout the Kingdom. In response, the Ministry of Health (MOH) has launched numerous digital initiatives, including electronic medical records, integrated hospital information systems, telemedicine services, electronic attendance and reporting platforms, mobile applications such as *Sehhaty*, appointment booking through *Mawid*, electronic prescription services (*Wasfaty*), and various digital communication tools that support collaboration among healthcare professionals (Al-Hanawi et al., 2019).

These initiatives have delivered considerable organizational benefits. Digital technologies have improved documentation accuracy, enhanced communication across healthcare teams, strengthened governance, increased transparency, and supported more effective clinical decision-making. Healthcare administrators can now monitor organizational performance through real-time dashboards and digital performance indicators, while healthcare professionals benefit from quicker access to patient information, standardized documentation, and better coordination across departments and healthcare facilities.

Despite these advantages, the increasing dependence on digital technologies has also introduced new workplace challenges. Healthcare professionals—including physicians, nurses, allied health staff, administrators, and health information specialists—are now expected to manage extensive electronic documentation, operate multiple digital applications, respond to continuous electronic communications, comply with electronic reporting requirements, and adapt to rapidly evolving digital systems. Consequently, many employees must balance direct patient care with a growing number of technology-related responsibilities that demand continuous attention and adaptation.

These changing work demands have led to growing interest in the concept of digital workload, which refers to the cognitive, physical, and psychological demands associated with performing work through digital technologies. Unlike traditional workload, which primarily reflects the quantity of work, digital workload encompasses the complexity of managing multiple information systems, processing electronic information, completing digital documentation, responding to automated alerts, navigating different software platforms, and adapting to continuous technological updates (Tarafdar et al., 2015). In healthcare settings, digital workload is often experienced through repetitive electronic documentation, sophisticated clinical information systems, mandatory reporting procedures, and ongoing digital communication with colleagues and administrators.

The rapid expansion of digital technologies has also drawn attention to technostress, a form of stress associated with the use of information and communication technologies. First introduced by Brod (1984), technostress describes the difficulty individuals experience when adapting to computer-based technologies. Since then, the concept has evolved into a multidimensional construct that captures the various pressures employees face in technology-intensive work environments.

Tarafdar et al. (2007) identified five major dimensions of technostress: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. These dimensions describe situations in which technology increases work demands, blurs the boundaries between work and personal life, becomes difficult to use, threatens employees' job security, or requires constant adaptation to technological change. Together, they provide a comprehensive framework for understanding the psychological impact of digital technologies in modern organizations.

Healthcare organizations provide an especially important context for studying technostress because healthcare professionals routinely work under high levels of responsibility, emotional pressure, time constraints, and complex clinical decision-making. Digital technologies are embedded throughout healthcare delivery, from patient registration and diagnostic imaging to medication management, appointment scheduling, quality monitoring, incident reporting, and workforce administration. While these technologies improve efficiency and service quality, they can also increase employees' cognitive burden when technological demands exceed their ability to cope (La Torre et al., 2020).

Another important concept closely linked to employee performance is psychological well-being. The World Health Organization (2018) defines psychological well-being as a state in which individuals recognize their abilities, cope effectively with everyday stress, work productively, and contribute positively to society. It extends beyond the absence of mental illness and includes positive emotional functioning, resilience, life satisfaction, vitality, and healthy interpersonal relationships. Within healthcare organizations, psychological well-being plays a critical role because it influences employee engagement, organizational

commitment, productivity, absenteeism, turnover intentions, and ultimately the quality and safety of patient care.

Previous studies have consistently shown that healthcare professionals experiencing high levels of technostress are more likely to report reduced psychological well-being, emotional exhaustion, lower job satisfaction, and symptoms of burnout (Shanafelt et al., 2016; Topp et al., 2015). Burnout has become a global concern because it affects not only healthcare workers but also patient safety, healthcare quality, and overall organizational performance. Understanding how digital workload contributes to technostress and how technostress influences psychological well-being has therefore become increasingly important for healthcare organizations implementing digital transformation initiatives.

Although Saudi Arabia has made remarkable progress in digitalizing its healthcare system, relatively little empirical research has explored the psychological effects of digital work environments on healthcare employees. Most previous studies have focused on technology adoption, electronic health records, telemedicine, or healthcare information systems from operational and technical perspectives. Comparatively few have examined the combined relationships among digital workload, technostress, and psychological well-being using internationally validated instruments such as the Technostress Creators Scale and the WHO-5 Well-Being Index. This represents an important gap in the literature because successful digital transformation depends not only on technological capability but also on employees' ability to adapt to increasingly digital workplaces.

Organizational support may play an important role in addressing these challenges. Supportive leadership, comprehensive digital training, effective technical assistance, employee participation in technology implementation, and user-friendly system design can help employees adapt more effectively to digital work demands. Consistent with the Job Demands–Resources (JD–R) Model, organizational resources can reduce the negative effects of demanding work conditions and strengthen employees' capacity to cope with occupational stress. Examining the moderating role of organizational support may therefore provide valuable guidance for healthcare organizations seeking to protect employee well-being while advancing digital transformation.

Against this background, the present study investigates the relationships among digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. Specifically, it examines whether digital workload increases technostress, whether technostress negatively affects psychological well-being, and whether organizational support helps mitigate these effects. By drawing on established theoretical frameworks and validated measurement instruments, this research contributes to the growing body of knowledge on digital workplace health and offers evidence-based recommendations for healthcare leaders and policymakers. Ultimately, the findings are expected to support the creation of healthier, more sustainable digital work environments and contribute to the successful realization of Saudi Vision 2030.

1.2 Problem Statement

The rapid adoption of digital technologies has transformed healthcare systems worldwide, changing how healthcare organizations deliver services, manage clinical information, and perform administrative operations. Technologies such as Electronic Health Records (EHRs), Hospital Information Systems (HIS), telemedicine, digital workforce management systems, and electronic communication platforms have become essential

components of modern healthcare. These innovations have improved efficiency, strengthened patient safety, enhanced access to information, and supported evidence-based clinical decision-making (World Health Organization [WHO], 2021). Despite these benefits, they have also reshaped employees' daily responsibilities, requiring healthcare professionals to rely heavily on complex digital systems to perform routine clinical and administrative tasks.

As healthcare organizations continue to digitalize their operations, employees are expected to complete extensive electronic documentation, manage multiple software applications, respond to continuous digital communications, and adapt to frequent technological updates while maintaining high standards of patient care. Although digital technologies have streamlined many organizational processes, they have also increased the cognitive and psychological demands placed on healthcare professionals (Tarafdar et al., 2015).

One consequence of this transformation is the emergence of digital workload, which extends beyond the traditional concept of workload. Digital workload reflects the mental, cognitive, and operational effort required to interact continuously with digital technologies. Healthcare employees often face information overload, frequent system notifications, complex software interfaces, and the need to switch between multiple digital platforms while working under strict time constraints. These demands may increase mental fatigue, reduce employees' sense of control over their work, and contribute to occupational stress.

A growing body of research suggests that excessive digital demands can lead to technostress, defined as the stress individuals experience as a result of using information and communication technologies in the workplace (Brod, 1984). Previous studies have linked technostress to emotional exhaustion, lower job satisfaction, burnout, reduced work performance, and decreased organizational commitment (Ragu-Nathan et al., 2008; La Torre et al., 2020). Healthcare professionals are particularly vulnerable because they routinely work in environments characterized by high responsibility, complex decision-making, time pressure, and continuous interaction with digital systems.

The psychological well-being of healthcare employees has therefore become an important concern during the ongoing digital transformation of healthcare. Prolonged exposure to high digital workload and technostress may lead to anxiety, fatigue, emotional exhaustion, reduced motivation, and burnout, ultimately affecting employee performance, patient safety, and the quality of healthcare services (Shanafelt et al., 2016). Protecting employees' well-being has consequently become essential for healthcare organizations seeking to achieve sustainable digital transformation while maintaining a healthy and productive workforce.

In Saudi Arabia, digital transformation has become a cornerstone of healthcare reform under Saudi Vision 2030. To support this vision, the Ministry of Health has invested extensively in digital health initiatives, including electronic medical records, integrated hospital information systems, telemedicine services, electronic reporting systems, digital attendance platforms, and other technologies designed to improve healthcare quality and operational efficiency (Al-Hanawi et al., 2019). As these technologies become more deeply embedded in healthcare practice, employees are increasingly required to work in highly digitalized environments that demand continuous interaction with multiple technological systems.

Despite these developments, limited empirical research has examined the psychological impact of digital transformation on healthcare employees in Saudi Arabia. Existing studies have largely concentrated on technology adoption, implementation success, electronic

health records, and operational performance, while giving comparatively less attention to the human consequences of increasing digital work demands. Moreover, many previous studies have relied on qualitative methods or general measures of occupational stress rather than validated instruments specifically designed to assess technostress and psychological well-being. As a result, there remains insufficient empirical evidence regarding how digital workload contributes to technostress and how technostress subsequently affects employees' psychological well-being within the Saudi healthcare context. Similarly, the potential buffering role of organizational support—including leadership support, digital training, technical assistance, and user-friendly system design—has received limited investigation.

This gap is important because the success of digital transformation depends not only on technological infrastructure but also on the ability of healthcare employees to adapt to digital work environments without compromising their psychological health. Ignoring the human dimension of digital transformation may contribute to higher levels of burnout, lower job satisfaction, reduced organizational performance, and, ultimately, poorer quality and safety of healthcare services.

To address this gap, the present study investigates the relationships among digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. Specifically, it examines whether digital workload increases technostress, whether technostress negatively affects psychological well-being, and whether organizational support moderates the relationship between digital workload and technostress. By providing empirical evidence from the Saudi healthcare context, this study aims to support healthcare leaders and policymakers in developing strategies that promote employee well-being while ensuring the long-term success and sustainability of digital transformation initiatives under Saudi Vision 2030.

1.3 Significance of the Study

This study is important because healthcare is increasingly dependent on digital technologies (in particular information technology) and the well-being of healthcare professionals is increasingly key in the digital transformation process. Although digital health technology has been instrumental in enhancing healthcare quality, efficiency, and organizational performance, it has also brought with it new challenges for healthcare professionals: digital workload, constant connection, and technology-related stress. Understanding the health of healthcare workers and their needs is key to making sure that digital transformation moves through the organization successfully for the long term and that it doesn't interfere with their health and performance. This study is also timely as smart healthcare technologies are being adopted rapidly by healthcare organizations worldwide. These technological advances have changed the nature of healthcare workers' interaction with digital systems and human work and the traditional clinical and administrative workflow. Although these technologies add a lot of organizational advantages for organizations, they may also boost staff cognitive load and put them at higher levels of technostress. Because of that, this is the reason for exploring the relationship between digital workload, technostress, and psychological health in healthcare professionals, administrators, leaders, and policymakers. The importance of the current study is three-fold: theoretical, practical, and policy.

The significance of this study can be viewed from three perspectives: theoretical, practical, and policy significance.

1.3.1 Theoretical Significance

From the theoretical perspective, this study contributes to the growing body of knowledge about digital transformation and employee well-being in healthcare organizations. Technostress has been extensively studied in information systems, organizational behavior and business management. Very few studies have been conducted in healthcare, especially in developing countries. Healthcare facilities are not like other industries in that employees have to deal with high responsibility, complicated decision-making, multiple people in the same team and have to face emotional stress and have to deal with their emotions in the workplace all the time. Such characteristics indicate that the impact of digital workload and technostress might be different in healthcare and other organizations than just in a general sense. In particular, we analyze how digital workload impacts healthcare workers in mediated technostress and how psychological well-being is important to the organization. Our study is focused on the connection between technology-related workload and technology-related occupational stress in healthcare institutions and provides empirical evidence for its application in the highly digitalized healthcare industry. Our study also contributes to the Job Demands–Resources (JD-R) Model as it considers digital workload as an emerging job demand that may negatively impact employees' psychological health. We also examine organizational support as an organizational resource that could be used to mitigate the negative effect of increasing technology demands. By examining these theoretical relationships in Saudi healthcare institutions, we provide evidence that the JD-R model is applicable to the healthcare industry in a technologically driven country. This study also contributes to the Technology Acceptance Model (TAM) by pointing out that employees' experiences with digital systems are not only influenced by their usefulness and ease of use but also psychological factors that are associated with constant use of digital systems. These theoretical perspectives provide a broad perspective to understand the human consequences of healthcare digitalization. Finally, the research fills a gap in the existing Saudi healthcare literature. Most existing studies have focused on technology implementation, system adoption, electronic health records, telemedicine or digital health services from a technological and operational perspective. In comparison, little empirical research has studied psychological aspects of digital transformation using internationally validated tools such as the Technostress Creators Scale and WHO-5 Well-Being Index. Therefore, this study contributes to the academic literature by offering empirical evidence of the psychological effects of digital work environment on healthcare workers in Saudi Arabia.

1.3.2 Practical Significance

From an operational point of view, this study offers insight for healthcare managers, organizational leaders, and hospital managers to do the implementing and managing of digital transformation. With healthcare organizations investing in the latest digital technologies for better efficiency and digital transformation in healthcare institutions, it is important to realize that digital-enabled technologies are not enough to make it work well in an organization, so we are going to need to get the IT staff to adapt to the digital world. The results of the study may help healthcare organizations to identify the organizational factors that contribute to digital workload and technostress in healthcare workers. Given these aspects, administrators can design targeted interventions in order to reduce

technological stress while also supporting the operational benefits of digital healthcare systems. This could be better system usability, easier administration of electronic documentation, better technical support services, and continuous digital training. The research is also expected to provide us with better workforce management strategies. With this research, healthcare leaders can better develop organizational support systems and leadership structures to support innovation, and better employee engagement and a healthier digital work environment where technology is an innovation and employees are happy and stay together. A reduction in technostress may also lead to improved employee satisfaction, lower burnout rates, increased productivity, stronger commitment to the organization, and lower workforce turnover. And healthcare workers might be better prepared in that way. In terms of education, healthcare organizations can develop learning on digital skills and how to cope and remain resilient in the midst of technologically demanding work environments. Those programs may lead to better psychological well-being, job satisfaction, and better work performance. The positive impact of employee well-being on patient care will be borne out of such efforts. With lower levels of stress and better psychological well-being, healthcare professionals are usually more engaged, more productive in their work, and can better deliver safe, quality healthcare services. So, the well-being of employees in digital work environments is also related to patient safety, quality of healthcare, and organizational performance.

1.3.3 Policy Significance

At a policy level, this study is of great relevance to health policymakers and government organizations in Saudi Arabia that are responsible for digital transformation. Digital transformation, therefore, is a key part of a vision for the implementation of Saudi Vision 2030 that aims to modernize the healthcare sector (healthcare access and accessibility, institutional governance, and service delivery) in the country. Although huge investments have been made in digital infrastructure, little is known about the psychological impact of these technological shifts on healthcare employees. This study will give evidence-based guidance for the Ministry of Health, healthcare regulatory bodies, and healthcare organizations to develop policies for digital transformation to be more balanced and to integrate technology and employees in the healthcare business with the health and well-being of healthcare employees. The study also supports larger national objectives of workforce sustainability and healthcare quality improvement. Protecting the psychological health of healthcare professionals is an important part of a stable and resilient healthcare workforce capable of adapting to the ever-changing technological environment. This is the key evidence to ensure that future digital transformation efforts are sustainable and in line with the long-term vision of Saudi Vision 2030. In summary, this study has been of importance to academic knowledge, healthcare management practice, and the implementation of evidence-based policymaking. By exploring how digital workload, technostress, psychological well-being, and organizational support are related in Saudi smart healthcare systems, the study provides our understanding of the human aspect of digital transformation and provides practical advice for creating healthier, more sustainable digital work environments.

The significance of this study lies in the growing dependence of healthcare organizations on digital technologies and the increasing awareness that successful digital transformation depends not only on advanced technological infrastructure but also on the well-being and adaptability of the healthcare workforce. Although digital health technologies have significantly improved healthcare delivery, operational efficiency, and patient outcomes, they have also introduced new challenges related to digital workload, constant connectivity, and technology-induced stress. Understanding how these challenges influence healthcare employees is essential for ensuring that digital transformation enhances organizational performance without negatively affecting employee health and productivity.

The study is particularly relevant at a time when healthcare organizations around the world are rapidly adopting smart healthcare technologies such as electronic health records, hospital information systems, telemedicine, artificial intelligence, digital reporting platforms, and workforce management systems. These innovations have transformed daily healthcare practice by increasing employees' interaction with digital technologies and reshaping traditional workflows. While these changes have brought substantial organizational benefits, they have also increased cognitive demands and created new sources of workplace stress. Consequently, exploring the relationships among digital workload, technostress, psychological well-being, and organizational support is becoming increasingly important for researchers, healthcare leaders, and policymakers.

1.4 Research Objectives

The primary objective of this study is to investigate the relationships among digital workload, technostress, and psychological well-being among employees working in Saudi smart healthcare systems. As healthcare organizations increasingly depend on digital technologies to improve service delivery, operational efficiency, and healthcare quality, it has become essential to understand how these technologies influence employees' experiences in the workplace. While digital transformation offers numerous organizational benefits, it also creates new challenges, including increased digital workload, greater reliance on technology, and higher levels of technology-related stress. Understanding these challenges is important for ensuring that digital transformation enhances healthcare delivery without compromising employees' psychological well-being.

This study also seeks to generate evidence that can support the successful and sustainable implementation of digital transformation within Saudi healthcare organizations. By examining the relationships among digital workload, technostress, psychological well-being, and organizational support, the study aims to identify factors that contribute to employees' well-being and those that may reduce the negative effects of digital work demands. The findings are expected to assist healthcare leaders and policymakers in developing strategies that promote healthier digital work environments while maintaining the benefits of technological innovation.

General Objective

The general objective of this study is:

To examine the relationship between digital workload, technostress, and psychological well-being among employees working in Saudi smart healthcare systems.

Specific Objectives

To achieve the overall purpose of the study, the following specific objectives are proposed:

1. To measure the level of digital workload experienced by employees working in Saudi smart healthcare systems.
2. To assess the prevalence and intensity of technostress among healthcare employees who regularly interact with digital technologies.
3. To evaluate the psychological well-being of healthcare employees using the World Health Organization Five Well-Being Index (WHO-5).
4. To examine the relationship between digital workload and technostress among healthcare employees.
5. To investigate the relationship between technostress and psychological well-being.
6. To determine whether technostress mediates the relationship between digital workload and psychological well-being.
7. To examine the moderating role of organizational support in the relationship between digital workload and technostress.
8. To identify practical strategies that healthcare organizations can implement to reduce technostress and promote employees' psychological well-being during digital transformation.
9. To provide evidence-based recommendations for healthcare administrators and policymakers to support sustainable digital transformation while maintaining workforce well-being within Saudi healthcare organizations.

Main Research Question

What is the relationship between digital workload, technostress, and psychological well-being among employees working in Saudi smart healthcare systems, and how does organizational support influence these relationships?

Secondary Research Questions

1. What is the level of digital workload experienced by employees working in Saudi smart healthcare systems?
2. What is the prevalence and intensity of technostress among healthcare employees who regularly interact with digital technologies?
3. What is the level of psychological well-being among healthcare employees?
4. Is there a significant relationship between digital workload and technostress among healthcare employees?
5. Is there a significant relationship between technostress and psychological well-being among healthcare employees?
6. Does technostress mediate the relationship between digital workload and psychological well-being?

7. Does organizational support moderate the relationship between digital workload and technostress?
8. What practical strategies can healthcare organizations implement to reduce technostress and improve employees' psychological well-being during digital transformation?
9. What evidence-based recommendations can be provided to healthcare administrators and policymakers to support sustainable digital transformation while maintaining workforce well-being in Saudi healthcare organizations?

1.6 Research Hypotheses

The hypotheses of this study were developed based on the research problem, objectives, conceptual framework, and the theoretical foundations underpinning the study. They are informed by the Technostress Model, the Job Demands–Resources (JD–R) Model, and the Technology Acceptance Model (TAM), which collectively explain how increasing digital work demands may affect employees' psychological well-being and how organizational resources can help reduce these effects.

Previous studies suggest that employees who are exposed to high levels of digital workload are more likely to experience technostress due to continuous interaction with digital technologies, increasing information overload, complex software systems, and growing electronic work demands (Tarafdar et al., 2007; Tarafdar et al., 2015). Research has also shown that elevated levels of technostress are associated with poorer psychological well-being, emotional exhaustion, lower job satisfaction, and burnout among employees working in technology-intensive environments (La Torre et al., 2020). In addition, organizational support, including leadership support, technical assistance, digital training, and user-friendly technologies, has been identified as an important factor that can lessen the negative psychological impact of digital work demands.

Based on these theoretical and empirical foundations, the following hypotheses are proposed:

H1

Digital workload has a significant positive relationship with technostress among employees working in Saudi smart healthcare systems.

This hypothesis proposes that employees who experience higher levels of digital workload are more likely to experience greater technostress due to increasing technological demands, extensive electronic documentation, continuous interaction with digital systems, and information overload.

H2

Technostress has a significant negative relationship with psychological well-being among employees working in Saudi smart healthcare systems.

This hypothesis suggests that employees experiencing higher levels of technostress are likely to report lower levels of psychological well-being, including reduced emotional well-being, lower vitality, decreased job satisfaction, and poorer overall mental health.

H3

Technostress mediates the relationship between digital workload and psychological well-being among employees working in Saudi smart healthcare systems.

This hypothesis assumes that the effect of digital workload on psychological well-being occurs partly through technostress. In other words, increased digital workload is expected to raise technostress, which subsequently contributes to lower psychological well-being.

H4

Organizational support moderates the relationship between digital workload and technostress among employees working in Saudi smart healthcare systems.

This hypothesis proposes that organizational support weakens the positive relationship between digital workload and technostress. Employees who receive adequate support through effective leadership, technical assistance, digital training, and user-friendly technologies are expected to experience lower levels of technostress, even when faced with high digital workloads.

Together, these hypotheses form the basis for testing the proposed conceptual framework of the study. Examining these relationships will improve understanding of how digital work environments influence the psychological well-being of healthcare employees and the extent to which organizational support can reduce the negative effects of increasing digital demands. The findings are expected to provide evidence-based insights that can guide healthcare leaders and policymakers in designing strategies that promote employee well-being while supporting the successful and sustainable digital transformation of Saudi Arabia's healthcare sector.

1.7 Theoretical Framework

A theoretical framework is the basic conceptual basis for a research study to explain the relationship between the variables under study as well as how to form research hypotheses. It is a systematic framework that allows researchers to make sense of research findings in the context of established theories and help to provide a coherent explanation of the phenomena to be studied. In organizational and healthcare research, theoretical frameworks are important because they provide a logical framework for understanding how workplace factors influence employee attitudes, behaviors, and organizational outcomes (Creswell & Creswell, 2018). The present research explores the impact of digital workloads, technostress, and psychological well-being of employees working in Saudi smart healthcare systems. As the healthcare industry pushes forward with technological advancements, healthcare workers must interact with electronic health records, hospital information systems, digital communication platforms, workforce management systems, and other information technologies that are very much a part of healthcare delivery. These technologies are of high efficiency and healthcare quality but also have new workplace expectations that could affect employees' psychological well-being. In order to understand these relationships, we need to develop a theory that can explain the technological and psychological aspects of the digital work environment. This study therefore combines three related theories (Technology Acceptance Model, Job Demands–Resources (JD–R) Model, and Technostress Model) in order to do it. The theories collectively can explain how increasing digital demands create technological stress, how organizational resources affect employees' ability to meet work-related demands, and how employees' perception of

technology affects how they interact with digital systems. Combining these theories gives us a holistic view of how technology and psychological well-being are influenced by digital workloads and how support from the organization can be moderated. Each theory adds a different perspective that adds to the conceptual foundation of the study.

1.7.1 Technostress Model

The primary theoretical foundation of this study is the Technostress Model, which explains the stress individuals experience as a result of using information and communication technologies in the workplace. Brod (1984) first described technostress as an adaptation problem arising from employees' inability to cope effectively with computer technologies. Since then, the concept has become one of the most widely used frameworks for understanding technology-related stress in organizational settings.

Tarafdar et al. (2007) expanded the concept by introducing the Technostress Creators Framework, which identifies five major sources of technology-related stress:

1-Techno overload refers to situations where technology increases both the amount and pace of work.

2-Techno-invasion occurs when digital technologies blur the boundaries between work and personal life through continuous connectivity.

3-Techno-complexity reflects employees' perceptions that digital systems are difficult to learn or operate.

4-Techno-insecurity describes concerns that technological advances may threaten employees' job security or require skills they do not possess.

5-Techno-uncertainty arises from frequent technological changes that require employees to continually adapt to new systems and procedures.

These five dimensions are highly relevant in healthcare settings, where professionals routinely use multiple digital systems while working under significant time pressure and responsibility. Consequently, the Technostress Model provides the principal theoretical explanation for how digital workload contributes to technology-related stress among healthcare employees.

1.7.2 Job Demands–Resources (JD–R) Model

The second theoretical perspective we use for this study is the Job Demands–Resources (JD–R) Model developed by Demerouti et al. (2001) and subsequently expanded by Bakker and Demerouti (2007). The JD–R Model has become one of the most influential models of occupational stress, employee well-being, burnout and work engagement in various organizational settings. According to the JD–R Model there are two fundamental types of work characteristics: job demands and job resources. Job demands are the aspects of work that are physically, cognitively or emotionally demanding and thus psychologically costly. Job resources are the resources (organizational, social and personal) that enable employees to reach their work objectives, reduce requirements, or foster self-improvement. Digital workload is a new job demand in the context of this study and healthcare employees need to constantly interact with digital technologies, develop electronic documentation, develop sophisticated software systems and communicate with others all the time. Digital work can create an overload on employees' minds and may cause technostress and psychological illness. Organizational support is an important job resource, on the other hand. This support can range from effective leadership, technical support, employee training, good technological infrastructure, user-

friendly digital systems, to supportive workplace policies and so on. According to the JD-R Model, these resources can mitigate the negative effects of job demands by helping employees cope with the challenges of work, thus mitigating burnout and psychological stress. The JD-R Model is therefore a strong theoretical motivation to look at organizational support in the present study as a moderating factor. Healthcare employees with better organizational support are more likely to cope with increased digital workload and thus have lower technostress and better psychological well-being.

1.7.3 Technology Acceptance Model (TAM)

Davis (1989) proposed the Technology Acceptance Model (TAM) that is a third theory to guide this study. TAM, as one of the most widely used theories for how employees accept and use information technologies, is based on two basic factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to what proportion of employees think that a specific technology will boost their job performance. When people feel that technology is easy to use, they can also feel that they can operate it easily. Technology that is useful and easy to implement is more likely to be used by employees. In healthcare organizations, digital technology acceptance is very important as employees are constantly using electronic health records, clinical information systems, telemedicine platforms, and even as a means of communication across the organization. If that technology is hard to use or the user feels that it is a complicated piece of work, the employee will become frustrated and will develop technostress. Technologies that are useful and simplify clinical work and reduce administrative burden are more likely to be accepted and integrated into day-to-day work. While this study does not focus on technology adoption, TAM can offer theoretical insight into how employees' experiences with digital systems may influence their psychological responses. Poor usability and technological complexity may raise digital workload and technostress, whereas user-friendly technologies reduce technology-related stress and facilitate healthier digital work

1.7.4 Conceptual Framework of the Study

Drawing on these three theoretical perspectives, this study proposes a conceptual framework in which digital workload serves as the independent variable, technostress acts as the mediating variable, psychological well-being represents the dependent variable, and organizational support functions as the moderating variable.

The framework proposes that higher levels of digital workload increase technostress among healthcare employees. In turn, increased technostress is expected to reduce psychological well-being by increasing emotional strain and limiting employees' ability to cope effectively with workplace demands. At the same time, organizational support is expected to weaken the relationship between digital workload and technostress by providing employees with the resources needed to manage digital demands more effectively.

By integrating the Technostress Model, the JD-R Model, and the Technology Acceptance Model, this framework offers a comprehensive explanation of the psychological processes associated with digital transformation in healthcare. It also provides the conceptual basis for the study's hypotheses and guides the empirical examination of the relationships among digital workload, technostress, psychological well-being, and organizational support within Saudi smart healthcare systems.

Chapter 2

Literature Review

2.1 Introduction

The healthcare sector has experienced unprecedented digital transformation over the past two decades, driven by rapid technological advancements and the widespread adoption of digital health solutions. Healthcare organizations around the world are increasingly integrating digital technologies into clinical, administrative, and operational processes to improve healthcare quality, increase efficiency, strengthen patient safety, and support evidence-based decision-making. Technologies such as Electronic Health Records (EHRs), Hospital Information Systems (HIS), telemedicine, artificial intelligence (AI), cloud computing, mobile health applications, clinical decision support systems, and electronic workforce management systems have become essential components of modern healthcare delivery (World Health Organization [WHO], 2021).

Digital transformation is no longer limited to introducing new technologies; it represents a comprehensive organizational change that influences every aspect of healthcare delivery. Traditional methods of communication, documentation, information sharing, and performance management have gradually been replaced by digital processes that require healthcare professionals to interact continuously with multiple technological systems. As a result, digital technologies have become deeply embedded in everyday healthcare practice and now play a central role in healthcare reform initiatives across both developed and developing countries.

In Saudi Arabia, the digitalization of healthcare has accelerated significantly under the framework of Saudi Vision 2030, which identifies digital transformation as a key strategy for improving healthcare quality, expanding access to services, strengthening governance, and ensuring the long-term sustainability of the healthcare sector. In support of these objectives, the Ministry of Health has implemented a wide range of digital initiatives, including electronic medical records, integrated hospital information systems, telemedicine services, digital appointment platforms, electronic prescription systems, mobile health applications, and electronic performance monitoring systems. Together, these initiatives aim to establish a smart, integrated, and patient-centered healthcare system capable of delivering high-quality healthcare services through advanced digital technologies.

Despite the many advantages of digital transformation, it has also introduced new challenges for healthcare employees. Healthcare professionals are increasingly expected to complete electronic documentation, manage multiple information systems, respond to continuous digital communications, and adapt to rapidly evolving technologies while maintaining high standards of patient care. These additional responsibilities require new technical skills and increase the cognitive and psychological demands associated with healthcare work.

One concept that has emerged in response to these changes is digital workload, which refers to the additional cognitive, operational, and psychological effort required to perform work through digital technologies. Unlike traditional workload, digital workload encompasses activities such as electronic documentation, processing digital information, navigating multiple software platforms, responding to electronic communications, and adapting to ongoing technological changes. As digital workload increases, employees may experience greater cognitive strain, reduced efficiency, and higher levels of occupational stress, particularly when balancing technology-related tasks with direct patient care.

The psychological impact of digital workload has led to growing interest in the concept of technostress, which describes the stress individuals experience when working with

information and communication technologies. In healthcare settings, employees frequently encounter technology-related challenges such as information overload, complex software systems, continuous system updates, constant electronic connectivity, and increasing expectations for digital performance. These demands may negatively affect employees' psychological health, work engagement, job satisfaction, and organizational commitment, ultimately influencing both workforce sustainability and the quality of healthcare services.

Another important concept in organizational research is psychological well-being, which reflects employees' emotional health, resilience, life satisfaction, and ability to cope effectively with workplace demands. Within healthcare organizations, maintaining psychological well-being is particularly important because healthcare professionals work in environments characterized by high responsibility, complex clinical decision-making, and emotionally demanding interactions with patients. Numerous studies have shown that employees with higher levels of psychological well-being tend to be more engaged, productive, and capable of delivering safe, high-quality patient care. Conversely, prolonged workplace stress may contribute to burnout, emotional exhaustion, absenteeism, turnover intentions, and reduced organizational performance.

To address these challenges, increasing attention has been given to organizational support as a key factor that helps employees adapt to digital work environments. Organizational support may include effective leadership, ongoing technical assistance, digital skills training, user-friendly technologies, and workplace policies that facilitate technology adoption while minimizing technology-related stress. Organizations that invest in these resources are more likely to improve employees' confidence in using digital technologies, enhance job satisfaction, and reduce the negative consequences associated with increasing digital workload.

Although the adoption of digital healthcare technologies has expanded rapidly both globally and within Saudi Arabia, important gaps remain in understanding their psychological impact on healthcare employees. Most previous studies have focused on technology implementation, electronic health records, telemedicine, and healthcare information systems from technical or operational perspectives. Comparatively little attention has been paid to examining how digital workload contributes to technostress, how technostress affects psychological well-being, and how organizational support may reduce these negative effects, particularly within the Saudi healthcare context.

Accordingly, this chapter reviews the literature related to digital workload, technostress, psychological well-being, and organizational support within smart healthcare systems. It begins by discussing the evolution of digital transformation in healthcare and the development of smart healthcare systems before examining each of the study variables in detail. The chapter then reviews relevant international and Saudi studies, identifies existing research gaps, and concludes by presenting the theoretical and conceptual framework that guides the present study. This review provides the scientific foundation for the proposed research model and demonstrates the importance of examining the relationships among digital workload, technostress, psychological well-being, and organizational support in Saudi smart healthcare systems.

2.2 Literature Review

The literature review is a vital part of academic research because it provides a comprehensive understanding of existing knowledge related to the research topic and establishes the theoretical foundation for the study. It enables researchers to examine previous studies critically, identify relevant theories and empirical evidence, highlight inconsistencies in the literature, and recognize gaps that require further investigation. By synthesizing prior research, the literature review justifies the research problem, conceptual framework, hypotheses, and methodology adopted in the study (Creswell & Creswell, 2018; Saunders et al., 2019).

The rapid digitalization of healthcare has attracted significant attention from researchers in recent years. Advances in information and communication technologies (ICTs), artificial intelligence (AI), cloud computing, big data analytics, telemedicine, and mobile health applications have transformed healthcare delivery and organizational management. Although these technologies have improved healthcare accessibility, efficiency, and clinical decision-making, they have also introduced new challenges that affect employees' cognitive, emotional, and psychological well-being. Consequently, research has shifted from focusing solely on technology adoption to examining its impact on healthcare professionals and organizational sustainability.

Digital transformation has reshaped healthcare work by increasing employees' reliance on electronic systems for documentation, communication, clinical decision support, scheduling, reporting, and performance monitoring. Healthcare professionals are now expected to combine advanced digital skills with high-quality patient care in increasingly complex work environments. These changes have drawn attention to emerging concepts such as digital workload, technostress, digital fatigue, electronic burnout, and technology-related occupational stress.

Among these concepts, digital workload has become particularly important because it reflects the additional cognitive, operational, and psychological demands created by continuous interaction with digital technologies. Healthcare professionals experience digital workload through extensive electronic documentation, multiple information systems, digital communication platforms, reporting requirements, and ongoing software updates. As healthcare organizations continue to expand their digital infrastructure, understanding digital workload has become essential for maintaining workforce productivity and supporting sustainable healthcare delivery.

Closely associated with digital workload is technostress, which refers to the stress individuals experience as a result of using information and communication technologies. Since Brod (1984) first introduced the concept, technostress has become a major area of research in information systems and organizational psychology. Studies indicate that information overload, technological complexity, continuous connectivity, rapid technological change, and uncertainty regarding digital competence are key contributors to technostress. These challenges are particularly evident in healthcare, where employees work under high responsibility, time pressure, and patient safety requirements.

Growing evidence also highlights the importance of psychological well-being as an outcome of digital work environments. Psychological well-being encompasses emotional health, resilience, life satisfaction, and the ability to cope effectively with workplace demands. In healthcare organizations, employees' well-being directly influences work engagement, job satisfaction, organizational commitment, workforce retention, patient

safety, and the quality of care. Previous research consistently shows that prolonged occupational stress increases the risk of burnout, emotional exhaustion, anxiety, depression, and reduced job performance.

At the organizational level, research increasingly emphasizes the role of organizational support in helping employees adapt to digital transformation. Organizational support includes leadership encouragement, technical assistance, employee training, adequate technological resources, participative decision-making, and supportive workplace policies. Organizations that invest in these resources are better able to reduce technostress, improve employee satisfaction, and facilitate successful digital transformation.

Although digital workload, technostress, psychological well-being, and organizational support have each received considerable attention individually, relatively few studies have examined how these variables interact within healthcare settings. Most previous research has focused either on technology adoption or on occupational stress, with limited attention to the mechanisms through which digital workload influences employees' psychological well-being. Furthermore, empirical evidence from Saudi healthcare organizations remains limited despite the country's substantial investment in digital health initiatives under Saudi Vision 2030.

Accordingly, this chapter reviews the literature based on the key constructs of the proposed conceptual framework. It begins by examining digital transformation in healthcare and the evolution of smart healthcare systems, followed by an overview of digital health initiatives in Saudi Arabia. The chapter then discusses digital workload, technostress, psychological well-being, and organizational support, including their definitions, theoretical foundations, dimensions, measurement approaches, and applications in healthcare research. It also reviews relevant international, regional, and Saudi studies before identifying the research gaps that justify the present study.

Overall, this literature review provides the theoretical and empirical foundation for the study and supports the development of the proposed conceptual framework and research hypotheses. By integrating evidence from organizational behavior, information systems, occupational psychology, and healthcare management, it offers a comprehensive understanding of the human impact of digital transformation and provides the basis for developing evidence-based strategies to create healthier and more sustainable digital work environments within Saudi healthcare organizations.

2.2.1 Digital Transformation in Healthcare

Digital transformation has become a major factor in the development of healthcare systems today worldwide. Information and communication technologies (ICTs), artificial intelligence (AI), cloud computing, big data analytics, Internet of Medical Things (IoMT), blockchain technologies and mobile health applications have changed the way we provide, manage and assess health care services. Digital transformation is not just technology-driven improvements to the healthcare system, it is an organizational transformation that integrates digital tools in every aspect of healthcare processes, which brings change in clinical practice, administrative functions, communication systems and organizational decision-making (World Health Organization [WHO], 2021). It is a strategic process through which healthcare organizations redesign their operational models, clinical workflows, and organizational culture to make use of digital innovation (Vial, 2019). This transformation requires healthcare organizations to invest in advanced technology infrastructure, build new

capabilities, develop new skills and capabilities in the workforce, and establish governance systems for the next wave of technology development. Digital transformation is now seen as a multidimensional phenomenon that includes technological innovation, human resource development, organizational change management, and strategic leadership. For over two decades healthcare has been slow to adopt digital technologies because of patient safety, data privacy, regulatory compliance, financial constraints and the complexities of clinical workflows. Modern technologies have been fast and efficient in healthcare systems worldwide, and the demand for digitalization has increased in the last 20 years. The COVID-19 pandemic also amplified the transformation by highlighting the need for digital technology to keep health in good shape during the absence of access to physical contact. Telemedicine services, electronic consultations, remote patient monitoring and virtual health care services became integral to healthcare systems and demonstrate the relevance of digital technology in healthcare resilience to public health emergencies (Keesara et al., 2020). Modern digital healthcare systems are now comprised of a rich array of connected technology for clinical, administrative, and operational purposes. Electronic Health Records (EHRs) are one of the pillars of digital healthcare by providing a comprehensive and electronic record of the patients' medical history, lab results, imaging studies, medication records and clinical interactions. EHRs are used for rapid access to data for patient care, to reduce medical errors, and to support evidence-based clinical decision making as it relates to patient care (Adler-Milstein & Huckman, 2013). Medical departments and hospitals are also using IT systems (HIS) to manage administrative, financial and clinical processes (e.g., patient registration and appointment scheduling, billing, resource allocation, quality control, etc.) at more centralized sites in a single place. Telemedicine is one of the central components of digital transformation and helps healthcare professionals to deliver clinical services remotely using digital communication technologies. Telemedicine has increased access to healthcare and has made healthcare accessible to those in remote areas by making it possible to travel less and reduce travel and waiting time at the hospital (in many cases) and spending time in the hospital. With the use of telemedicine and through the use of digital technology and even the digital age of healthcare, we have seen how digital technology will help to increase the efficiency of medical care and patients will be treated better. AI has been instrumental in enabling healthcare digitalization in clinical decision making, diagnosis and predictive analysis of imaging and personalized medicine. AI-based algorithms are also increasingly used to detect diseases at a very early stage, to analyze large volumes of clinical data, predict patient outcomes, optimize resource allocation and in the clinical decision making process with healthcare professionals. In radiology, for instance, AI tools help interpret images and help radiologists diagnose and work faster. Machine learning algorithms are also used to predict hospital readmissions and identify high-risk patients and prevent them from needing to go to the hospital, and provide preventative healthcare services. Healthcare organizations are also increasingly using digital systems in clinical services and the workforce. Electronic workforce management systems enable attendance monitoring, scheduling, performance evaluation, competency management and staff communication. Digital reporting systems allow healthcare organizations to monitor quality metrics, patient safety incidents, infection control measures and organizational performance in real time. These technologies improve organizational governance, transparency and strategic decision making. But they also enhance employees' engagement with digital systems and increase the digital workload in

healthcare. The benefits of digital transformation are great and well-documented in the healthcare literature. Digital technologies improve health care quality by improving diagnostic accuracy, reducing medication errors, improving teamwork and communication in healthcare and by ensuring evidence-based care. They also result in a more efficient organization, reduced duplication of services, greater resource utilization and better patient service flow. Digital systems help patients access personal health records and schedule appointments online, communicate with healthcare personnel and actively manage their health condition. All these improvements in healthcare are part of the development of a safer, more efficient and more patient-centered healthcare sector. Yet digital transformation is also a huge organizational and human challenge. The most important problem with healthcare is that it becomes very complex with continuous interaction with many digital devices. Healthcare professionals spend a great deal of their working day writing papers, moving across various software platforms, answering alerts, and getting familiar with new digital technology. This kind of work may be draining, involve a lot of cognitive work and make the job less meaningful for patients. Similarly, software upgrades, interoperability issues, usability issues, cybersecurity issues, as well as little or no digital training also make it challenging to implement the technology and result in poor employee satisfaction. These challenges have led researchers to stress that digital transformation cannot be achieved without technological investment. Effective implementation requires a good leadership team, engagement of employees, digital competence development, change management strategy and continual support of the organization. Healthcare companies must therefore balance technology advancement with employee well-being for the good of health and for digital transformation to be most impactful for the health system and for human health to be a reality. The failure to take into account the human side of digital transformation may undermine the benefits of digital technology which leads to staff resistance and technology-related occupational stress. In the context of Saudi Arabia, digital transformation has been a national priority since Vision 2030, through the integrated digital health systems and electronic medical records, telemedicine platforms, artificial intelligence and data-driven healthcare management. The Ministry of Health, the Saudi Health Holding Company and other government organizations have been investing heavily in digital health infrastructure. They aim at creating a smart healthcare ecosystem that can improve healthcare accessibility, operational efficiency, patient experience and organizational performance. As healthcare digitalization is becoming an increasingly large part of society in Saudi Arabia, understanding its impact on healthcare employees is becoming increasingly important. Digital transformation is one of the most critical developments for the healthcare industry today. Technology has revolutionized healthcare quality and organizational efficiency, but has also changed the nature of healthcare work in a very big way that has brought the way people work to the digital age and has become dependent on digital systems. This new digital world has given rise to the idea that digital workload, technostress, psychological health and organizational support have also become more important in this digital age. In such a way, understanding digital transformation is the basis of deeper consideration of the next constructs explored in the present work and is a basis for investigating the human impact of healthcare digitalization in Saudi smart healthcare systems.

2.2.2 Smart Healthcare Systems

Smart Healthcare Systems has emerged as one of the most significant developments in the digital transformation of healthcare that has brought advanced digital technologies to the healthcare delivery to reduce costs, increase efficiency, accessibility and focus on patients. Unlike traditional healthcare systems which are based on paper records and fragmentation of information systems, smart healthcare systems integrate various digital technologies to build a system that is intelligent and data-driven that can make decisions according to the future trends and is well informed with daily healthcare management of healthcare in real time. Smart healthcare systems are based on the interplay of multiple digital technologies (Internet of Things (IoT), Artificial Intelligence (AI), Big Data Analytics, Cloud Computing, Electronic Health Records (EHRs), Mobile Health (mHealth), Telemedicine, Blockchain technology and wearable medical devices) to help healthcare providers make decisions in real time, the healthcare professionals can make clinical decisions in real time and healthcare professionals will be able to make better decisions and to do the right thing in real time. Smart healthcare systems are a part of the continuum of care and it is this integration that helps to improve patient care, healthcare coordination and healthcare outcomes by the availability of sufficient and timely information to healthcare providers. Smart healthcare systems are interconnected. Unlike standard healthcare systems, smart healthcare systems integrate various healthcare technologies into a common digital ecosystem and patient information is shared in safe and secure communication between departments, healthcare facilities and healthcare staff. Electronic Health Records are the central source for patient information, and doctors, nurses, pharmacists, lab staff and radiologists can access full clinical information when required. It improves communication, minimizes the number of medical procedures and improves the quality of care. Smart healthcare systems are based on data-driven decision-making. Healthcare organizations are generating a lot of data every day, and smart healthcare systems take advantage of big data and artificial intelligence with them to make sense of the data, to detect trends in the data, to predict disease progression and to make diagnosis and allocation more efficient. Predictive analytics, for example, can help healthcare providers in identifying patients who are at high risk for hospital readmission, predicting contagious disease and to make better use of healthcare when there is a strong demand. Hence healthcare organizations are moving away from experience-based and data-driven management and are in the process of making more data-driven decisions. In smart healthcare systems Artificial Intelligence has become one of the most useful tools. AI applications support the healthcare professionals in diagnostic imaging, pathology, laboratory medicine, clinical decision making, customized treatment planning and hospital operations. In radiology, AI algorithms help the radiologist to identify anomalies in medical images to prioritize those with urgent needs and improve diagnostic efficiency. Machine learning algorithms also support predictive modeling in healthcare to better identify high-risk patients, determine best treatment plans and improve population health management. AI is not replacing the person on the job, but rather is an instrument to support the professionals and improve clinical work and reduce the administrative burden of the day-to-day work. The digital communication technology has made healthcare professionals able to receive clinical consulting, follow-up care, chronic disease management and specialist consultations remotely online from secure digital platforms. Telemedicine became particularly critical during the COVID-19 pandemic when healthcare organizations wanted to maintain continuity of care but minimize face-to-face

interactions. Since then, virtual healthcare services have become a part of most large-scale health systems, which are now integrated into their systems and help patients access healthcare resources and travel time and accessibility for specialist care and specialist care to be available to people in the middle class is made much smoother for patients. Telemedicine also helps in reducing hospital visits and patient convenience and is also helpful in the cost efficiency aspect of healthcare. The Internet of Medical Things (IoMT) has increased the reach of smart healthcare systems to monitor patients on a daily basis by means of connected medical devices. Wearable sensors, smart watches, implantable devices, and remote monitoring equipment continuously monitor health parameters like heart rate, blood pressure, blood glucose levels, oxygen saturation and physical activity. These data are transferred to healthcare providers who can detect this, so that they can intervene early in the disease and reduce unnecessary hospital admissions and emergency room visits in the long run. Cloud computing is becoming an essential technological backbone for smart healthcare systems. Cloud-based platforms enable healthcare organizations to store huge volumes of clinical data in a secure manner and also to quickly retrieve healthcare data from multiple places. Cloud supports healthcare professionals, improves disaster recovery capabilities, reduces information technology infrastructure costs and enables large scale healthcare data analysis. Moreover, cloud computing allows healthcare organizations to integrate many digital applications to create one platform for the organization with better operational efficiency and information access. From an organizational perspective, smart healthcare systems can significantly improve healthcare management and governance. Healthcare administrators use digital dashboards, performance monitoring systems, electronic workforce management platforms and quality reporting systems to monitor organizational performance in real time. These technologies help in informing management decisions based on evidence-based information about workforce productivity, patient flow, health quality indicators, financial performance, and resource utilization. As a result, healthcare agencies are able to identify inefficiencies faster and implement targeted interventions based on objective organizational data. Smart healthcare systems also make patient-centered care more realistic and a top priority of healthcare delivery nowadays. Patients are now more involved in their health management via their mobile health apps, patient portals, electronic appointment apps and digital communication, and are able to engage with healthcare providers directly. Such technologies enhance patient engagement, promote joint decision making, support adherence to treatment and patient satisfaction. However, smart healthcare systems are not without challenges in organization. This requires a huge amount of money to come up with, better cybersecurity systems, regulatory compliance, training of staff and changing organizational environments. Healthcare professionals must constantly be on the move and be ready for the changes in technology and also be confident in the health of patients. Interoperability, system usability, data privacy, cybersecurity threats and digital literacy are all things healthcare organizations have to address in order to be able to implement smart healthcare systems. For sustainable digital transformation to exist, it is critical to synchronize technological innovation with organizational support and staff development. A similar issue with smart healthcare systems is the impact on healthcare workers. With the growing usage of digital technologies in clinical practice, healthcare staff spend more time interacting with digital systems, completing digital documentation, responding to electronic alerts and managing multiple software systems. Although these technologies increase the

efficiency of a health system, they also add to the cognitive burden of the staff and may result in increased digital workload, technology stress and psychological fatigue. For this reason, researchers have also claimed that smart healthcare systems should be analyzed in terms of the performance of the technology and to what extent it is beneficial to the employees and to the organization as a whole. Smart healthcare systems are among the key pillars of Vision 2030 in Saudi Arabia. The Ministry of Health has implemented a number of initiatives to build a digital healthcare ecosystem through electronic medical records, telemedicine services, digital health applications, artificial intelligence, unified health information systems, and national digital health platforms. They have aimed to improve access to healthcare, improve healthcare quality, optimize efficiency in the health system and enhance healthcare governance for the future to support the Kingdom's digital transformation. With these technologies being implemented in Saudi healthcare companies to the best of our knowledge, the organizational and psychological impact for healthcare staff is becoming more and more important. Smart healthcare systems are a holistic approach to healthcare delivery and organization and patient experience. While these systems have significant benefits for healthcare organizations and patients alike, they also change the nature of healthcare work by increasing the use of digital technologies by employees. This transformation has introduced new challenges in the workplace of digital workload, technostress, and employee welfare which make smart healthcare systems the most important organizational context in which the present study is situated. Understanding the features, benefits, and challenges of smart healthcare systems is therefore a key reference to understand the relationships between digital workload, technostress, psychological well-being, and organizational support in Saudi smart healthcare organizations.

2.2.3 Digital Health in Saudi Arabia

Digital health has become a key driver of healthcare transformation in the Kingdom of Saudi Arabia, reflecting the government's commitment to modernizing healthcare through advanced information and communication technologies (ICTs). This transformation has accelerated significantly since the launch of Saudi Vision 2030, which identifies digital transformation as a strategic priority for improving healthcare quality, enhancing operational efficiency, expanding access to healthcare services, and supporting sustainable national development (Ministry of Health [MOH], 2023).

Saudi Arabia's healthcare system has expanded rapidly in response to population growth, increasing life expectancy, the rising prevalence of chronic diseases, and growing public expectations for high-quality healthcare. These changes have placed greater demands on healthcare organizations to deliver efficient, accessible, and patient-centered services. In response, the government has invested heavily in digital health technologies to strengthen healthcare infrastructure, improve clinical outcomes, optimize organizational performance, and enhance the patient experience. As a result, digital transformation has become a central component of the Healthcare Transformation Program under Vision 2030 and the National Transformation Program (NTP).

The Healthcare Transformation Program focuses on creating an integrated digital healthcare ecosystem that supports high-quality, efficient, and patient-centered services. One of its main objectives is to establish a unified national digital health infrastructure that enables secure sharing of healthcare information across healthcare providers while supporting evidence-based clinical decision-making. The strategy also promotes the

adoption of telemedicine, artificial intelligence, electronic medical records, digital health applications, and integrated health information systems to improve continuity of care.

One of the most important achievements has been the widespread implementation of Electronic Health Records (EHRs) across public and private healthcare institutions. EHRs provide healthcare professionals with immediate access to comprehensive patient information, including medical history, laboratory results, imaging reports, medications, allergies, and clinical notes. Their implementation has improved documentation accuracy, enhanced communication among healthcare teams, reduced unnecessary duplication of diagnostic procedures, minimized medication errors, and strengthened continuity of patient care.

The Ministry of Health has also introduced several national digital health platforms that improve healthcare accessibility and patient engagement. Sehhaty provides a wide range of healthcare services, including appointment booking, vaccination records, prescription management, laboratory results, sick leave certificates, and personal health information. Mawid enables patients to book, modify, or cancel appointments electronically, reducing waiting times and improving access to primary healthcare services. Wasfaty supports electronic prescribing by allowing physicians to issue digital prescriptions that patients can obtain from participating community pharmacies.

Telemedicine has become another major pillar of Saudi Arabia's digital health strategy. Through the Seha platform, healthcare professionals provide virtual consultations, follow-up care, and health education using secure digital communication technologies. Telemedicine proved particularly valuable during the COVID-19 pandemic by ensuring continuity of healthcare despite movement restrictions, and it continues to improve healthcare accessibility while reducing unnecessary hospital visits.

Saudi Arabia is also investing heavily in Artificial Intelligence (AI) to improve healthcare delivery. AI applications support diagnostic imaging, pathology, clinical decision-making, personalized treatment planning, predictive analytics, and hospital operations. In specialties such as radiology and oncology, AI assists healthcare professionals by detecting abnormalities, prioritizing urgent cases, and improving diagnostic accuracy. Predictive analytics further supports healthcare planning by forecasting patient demand and optimizing resource allocation.

In addition to clinical applications, digital technologies have transformed healthcare administration. Hospital Information Systems (HIS), Enterprise Resource Planning (ERP) systems, workforce management platforms, digital attendance systems, electronic incident reporting, quality dashboards, and performance monitoring tools have become standard components of healthcare management. These technologies improve governance, transparency, resource utilization, and evidence-based decision-making across healthcare organizations.

Another significant development has been the establishment of the Saudi Health Holding Company (SHHC) and the creation of integrated health clusters. These reforms support greater coordination among healthcare providers and facilitate standardized implementation of digital health technologies across hospitals, primary healthcare centers, and specialized facilities. Integrated digital platforms also improve continuity of care by enabling secure exchange of patient information across the healthcare system.

The expansion of digital health has produced substantial benefits for patients, healthcare professionals, and healthcare organizations. Digital technologies have improved healthcare

accessibility, reduced waiting times, strengthened communication, enhanced documentation accuracy, supported evidence-based management, and encouraged patients to participate more actively in managing their own health.

Despite these achievements, digital transformation has also created new organizational challenges. Healthcare professionals now interact with multiple digital systems every day, including electronic medical records, prescribing platforms, reporting systems, workforce management applications, and communication tools. These additional responsibilities have increased digital workload, cognitive demands, and the need to adapt continuously to new technologies while maintaining high standards of patient care.

Another important challenge is ensuring workforce readiness. Successful implementation of digital health technologies requires healthcare professionals to possess adequate digital skills, technological competence, and the ability to adapt to continuous technological change. Consequently, healthcare organizations must invest not only in digital infrastructure but also in employee training, technical support, leadership development, and effective change management.

Cybersecurity and data privacy remain equally important. As healthcare organizations increasingly rely on electronic records, cloud computing, artificial intelligence, and interconnected information systems, strong cybersecurity frameworks are essential to protect sensitive patient information, maintain confidentiality, and comply with national data protection regulations.

Although Saudi Arabia has made remarkable progress in digital health implementation, relatively little research has examined its impact on healthcare employees. Most existing studies focus on technology adoption, telemedicine, healthcare information systems, patient satisfaction, or service quality, while limited attention has been given to the effects of digital transformation on employees' digital workload, technostress, and psychological well-being. As the Kingdom continues to expand smart healthcare systems under Vision 2030, understanding these human dimensions is becoming increasingly important.

In summary, Saudi Arabia has emerged as one of the regional leaders in digital health transformation. While digital technologies have significantly improved healthcare accessibility, efficiency, and patient-centered care, they have also changed the daily work of healthcare professionals by increasing their reliance on digital systems. Understanding these changes provides an important context for examining digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems.

2.2.4 Digital Workload

Digital workload has become a very important topic in organizational behavior, information systems, and healthcare management research as organizations are increasingly using digital technologies in their day-to-day work processes. The rapid adoption of electronic health records (EHRs), hospital information systems (HIS), telemedicine platforms, artificial intelligence (AI), mobile health applications, digital communication platforms, and electronic workforce management systems has changed the way healthcare professionals work. They have given healthcare the best quality of care, operational efficiency, and patient safety, but they also created a new type of workload that comes with every interaction with digital systems. So, digital workload is a very important construct for understanding the psychological and organizational impact of digital transformation,

especially in healthcare environments in which employees are putting themselves in high-risk and complicated situations. Digital workload is not only the number or intensity of work tasks but also the cognitive, operational, and psychological stress of using digital technologies in the workplace. Healthcare employees are having to access a variety of software applications; work with large volumes of digital material; respond to electronic notifications; interact with virtual communication; and keep up to date with a variety of technological developments while providing high-quality patient care. These other technological tasks require a lot of cognitive effort and may affect the work and performance of employees as well as psychological well-being. Digital workload refers to the mental, cognitive, and operational effort in order to take on work-related activities through digital technologies. Digital workload refers to the additional tasks that may be imposed by the continuous use of information and communication technologies (e.g., electronic documentation, digital communication, information processing, software navigation, data management, and interaction with multiple digital platforms). Digital workload is not just the volume of work but also technology-centric and is not easy to do and adapt to the digital world as it is very fast and dynamic. Digital workload has been conceptualized as an extension of cognitive workload and mental effort to process information, to make decisions, to solve problems, and to learn and use digital technology (Venkatesh et al., 2019). Digital workload in healthcare is related to patient data logging in electronic health records, laboratory and imaging tests, healthcare notifications, pharmaceutical prescription preparation by digital systems, appointment making online, virtual consultations, and electronic quality reports. These functions have become part and parcel of healthcare professionals' day-to-day work and need constant attention and knowledge of technology and cognitive flexibility. From a business perspective, digital workload is influenced by technological but also organizational factors. The number of digital systems used, the usability of software applications, the frequency of system updates, the volume of electronic communications, and the availability of technical support all affect employees' perceptions of digital workload. Digital workload is a multidimensional concept that relates technology, the work process, and human capabilities. Digital workload has several characteristics that differentiate it from traditional work. One of its characteristics is continuous connectivity. Digital technologies enable healthcare professionals to continuously connect to organizational systems with computers, smartphones, tablets, and other digital devices. This kind of connection enables quick communication and information exchange but also creates the expectation of constant availability and quick responses to any communication requests, which can make people have more work than they can do when working in a traditional workplace. Information intensity is another feature of a healthcare environment. Healthcare representatives working in digital environments must process a large number of clinical, administrative, and organizational information from multiple electronic systems. Electronic health records, laboratory reports, radiological images, clinical decision support alerts, emails, and digital notifications are competing for employees' attention and therefore may cause information overload. Multitasking is another important characteristic of digital work. In a digital work environment, employees are required to go from one software application to another quickly and simultaneously handle clinical work. Physicians can consult patients in person and then enter the notes in electronic form, check laboratory results, order diagnostic tests, and respond to electronic messages. Multitasking increases cognitive drain and may lower

concentration and efficiency at work. Digital workload is also characterized by continuous technology evolution. Healthcare organizations update software applications, introduce new digital systems, and modify old electronic processes. Healthcare employees need to learn and adapt to new technology and new digital processes constantly. This constant shift from one system to another can be mentally stressful, especially for employees who do not know digital systems or don't have enough support on the part of the organization. Digital workload is technology-dependent. With healthcare organizations increasingly relying on digital systems, the ability of employees to do their tasks every day is determined by the availability, reliability, and usability of technology. The problems of technical failures, system downtime, interoperability issues, and software usability could lead to immediate effects on employees' productivity and stress levels. Dimensions of Digital Workload.

There is no single method for the measurement of digital workload, but existing literature indicates that it has a number of related dimensions. The first one is the cognitive demand: the mental load to process information, interpret digital data, make decisions, and interact with multiple technology systems. Cognitive demand increases in healthcare professionals that have to deal with clinical information, electronic documentation, and digital communication. The second dimension is operational complexity, as the work can be done with multiple software platforms, electronic procedures, and digital tasks. Healthcare organizations often have a lot of different digital systems that are used for documentation, laboratory services, imaging, pharmacy, scheduling, and workforce management, where employees are constantly having to interact with different digital systems. A third dimension is information overload, as they get more digital information than they can process in a short period of time. Continuous electronic notifications, clinical alerts, emails, instant messages, and automated reminders can be difficult to keep track of for the employees and may increase their cognitive fatigue. Time pressure is the fourth dimension as digital technologies should allow for faster task completion but also document completion. Healthcare workers spend significantly more time on electronic documentation with no time for patient interaction, so that they are not able to spend time with their patients. The fifth dimension of digital workload is technological adaptation that is important as employees need to learn new software applications for modern day healthcare systems and be technologically competent. There are several factors in the healthcare industry with increasing digital load (organizational, technological, and personal) that are part of it. Organizational factors include increasing electronic documentation requirements, increased regulatory reporting requirements, performance monitoring systems, and the introduction of multiple digital platforms without good workflow integration. These changes often increase administrative duties and make healthcare professionals spend more time on digital tasks. Technical factors are poor system usability, software complexity, interoperability issues, frequent system updates, slow system performance, and insufficient technical support. Digital work can be felt as a lot harder to work on or less effective if the digital systems are difficult to use (or not integrated) to work on and can cause employees to have less cognitive energy. Digital literacy, technological skills, previous experience using digital systems, age, profession, and attitude towards digital work environments may affect employees' adaptation to digital work environments. Healthcare staff with a greater level of confidence are better able to handle digital demands, and those with a lower level of digital skills may find it more difficult to cope with digital work. Digital workload measurement. Researchers have used various measures to measure digital workload and it

is a multidimensional task so the objective measures include the time spent with digital systems, the number of electronic tasks completed, system usage logs, and electronic documentation time. But these objective measures may not address employees' subjective experiences of digital workload. In order to do that, many studies look at self-report questionnaires to gauge employees' perceptions of cognitive work, technological complexity, information overload, digital disruptions, and technology-related tasks. The tools developed in information systems research and occupational psychology are used to assess digital workload in different ways based on the employees' experience of working in technology-intensive environments. The use of objective measures and subjective evaluations can provide a more accurate picture of digital workload and its psychological effects.

Previous Studies on Digital Workload

Recent studies consistently identify digital workload as an important predictor of employee well-being and organizational performance. Research in healthcare has shown that extensive electronic documentation, frequent digital interruptions, and continuous interaction with multiple information systems increase cognitive workload, emotional exhaustion, and job dissatisfaction among healthcare professionals (Khairat et al., 2020). Other studies have reported that physicians and nurses spend a substantial proportion of their working time using electronic health records, reducing opportunities for direct patient care and increasing perceptions of administrative burden.

Previous research has also demonstrated a positive relationship between digital workload and technostress, indicating that increasing technological demands contribute significantly to technology-related stress (Tarafdar et al., 2015). Furthermore, high digital workload has been associated with lower psychological well-being, higher burnout, and reduced work engagement, particularly when organizational support is limited. Despite growing international evidence, relatively few studies have examined digital workload within Saudi healthcare organizations. Most local research has focused on technology implementation and adoption rather than the psychological consequences of increasing digital work demands. This gap highlights the importance of the present study in examining digital workload as a key predictor of technostress and psychological well-being among employees working in Saudi smart healthcare systems.

2.2.5 Technostress

Technostress has become one of the most widely studied concepts in information systems, organizational behavior, and occupational psychology as organizations increasingly depend on digital technologies. The widespread adoption of information and communication technologies (ICTs) has transformed workplaces across many sectors, including healthcare. Although these technologies have improved productivity, communication, and organizational efficiency, they have also introduced new psychological challenges associated with continuous technology use. Employees are now expected to manage multiple digital platforms, process large amounts of electronic information, adapt to frequent technological changes, and remain constantly connected, making technostress an important factor affecting employee performance, job satisfaction, and psychological well-being.

In healthcare, technostress has received particular attention because healthcare professionals work in demanding environments characterized by high responsibility,

complex decision-making, time pressure, and emotionally challenging patient care. The increasing use of Electronic Health Records (EHRs), Hospital Information Systems (HIS), telemedicine, artificial intelligence, digital communication platforms, and workforce management systems has significantly increased employees' dependence on technology. Understanding technostress is therefore essential for supporting successful digital transformation while protecting employees' mental health and maintaining high-quality patient care.

Historical Development of Technostress

The concept of technostress was first introduced by Craig Brod (1984), who described it as "a modern disease of adaptation" resulting from difficulties in coping with computer technologies. As digital technologies became more common during the 1990s, researchers recognized that technology-related stress extended beyond computer anxiety to include information overload, continuous connectivity, and changing work practices.

A major advancement occurred when Tarafdar et al. (2007) introduced the Technostress Creators Framework, which views technostress as a multidimensional construct rather than a single form of stress. Their framework identifies five major sources of technology-related stress: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. This model remains the most widely used framework for studying technostress across different industries, including healthcare.

The rapid expansion of artificial intelligence, cloud computing, mobile technologies, remote work, and smart healthcare systems has further increased the relevance of technostress. The COVID-19 pandemic accelerated healthcare digitalization, making technology-related stress an increasingly important issue affecting employee well-being, work engagement, organizational commitment, and job performance.

Definition of Technostress

Technostress refers to the psychological strain individuals experience when they are unable to cope effectively with the demands of information and communication technologies (Tarafdar et al., 2007). It results from continuous interaction with digital systems, technological complexity, information overload, rapid technological change, and constant electronic connectivity.

Unlike traditional occupational stress, which may arise from workload or organizational factors, technostress specifically originates from employees' interactions with technology. It may manifest through anxiety, frustration, emotional exhaustion, fatigue, reduced concentration, and decreased confidence in using digital systems. In healthcare settings, technostress commonly occurs when professionals struggle with electronic health records, hospital information systems, electronic documentation, digital alerts, or continuous technological updates.

Technostress Creators

According to Tarafdar et al. (2007), technostress arises from five key dimensions:

- 1- Techno-overload: Technology increases workload by creating expectations for faster performance, higher productivity, and continuous availability.
- 2- Techno-invasion: Digital technologies blur the boundaries between work and personal life, making employees feel constantly connected.
- 3-

3- Techno-complexity: Employees perceive digital systems as difficult to learn or operate, increasing cognitive effort.

4- Techno-insecurity: Employees fear that technological developments may threaten their professional competence or job security.

5- Techno-uncertainty: Frequent technological changes require employees to continually learn new systems and adapt to changing work environments.

Together, these five dimensions explain how technology can become a significant source of workplace stress.

Technostress Inhibitors

Research has also identified several organizational resources that reduce technostress. Tarafdar et al. (2015) describe these as technostress inhibitors, which help employees adapt successfully to digital work environments.

One important inhibitor is literacy facilitation, which includes digital skills training and continuous learning opportunities that improve employees' confidence in using technology.

A second is technical support provision, where timely assistance minimizes frustration, reduces workflow interruptions, and increases confidence in digital systems.

A third is involvement facilitation, which encourages employees to participate in planning, implementing, and evaluating new technologies. Employee involvement improves technology acceptance and creates a greater sense of ownership during organizational change.

Additional factors, including supportive leadership, effective communication, user-friendly technologies, realistic implementation plans, and adequate technological resources—have also been shown to reduce technology-related stress and facilitate successful digital transformation.

Technostress in Healthcare Organizations

Healthcare organizations provide a unique context for studying technostress because employees routinely work under high responsibility, time pressure, and emotionally demanding conditions. Daily interaction with electronic health records, computerized physician order entry systems, laboratory information systems, digital imaging platforms, telemedicine services, electronic prescribing systems, and workforce management applications has significantly increased employees' reliance on digital technologies.

Although these systems improve healthcare quality and efficiency, they also increase cognitive demands and psychological strain when technological requirements exceed employees' coping resources. Studies have linked technostress among healthcare professionals to emotional exhaustion, burnout, lower job satisfaction, reduced work engagement, decreased organizational commitment, and poorer patient care. Physicians often report spending excessive time on electronic documentation rather than direct patient interaction, while nurses experience stress related to electronic medication systems, patient monitoring technologies, and extensive digital documentation.

Previous Studies on Technostress

A growing body of empirical research has examined the antecedents and consequences of technostress across various organizational contexts. International studies consistently demonstrate that increasing technological demands significantly contribute to employee stress, emotional exhaustion, burnout, and reduced psychological well-being (Tarafdar et al., 2015; La Torre et al., 2020). Research has further shown that healthcare professionals working in highly digitalized environments frequently experience greater technostress than employees in less technology-intensive settings due to continuous interaction with multiple clinical information systems.

Recent healthcare studies have identified electronic health records, digital documentation requirements, information overload, system usability problems, and frequent technological changes as major contributors to technostress among physicians and nurses. Evidence also suggests that organizational support, effective leadership, comprehensive digital training, and user-friendly technologies significantly reduce technology-related stress and improve employees' ability to adapt successfully to digital work environments.

Despite the growing international literature, empirical studies investigating technostress within Saudi healthcare organizations remain relatively limited. Most existing Saudi research has concentrated on technology adoption, electronic health records, telemedicine implementation, or healthcare information systems rather than examining the psychological consequences of continuous technology use. Furthermore, relatively few studies have investigated technostress using validated multidimensional measurement instruments while simultaneously examining its relationship with digital workload, psychological well-being, and organizational support. This gap provides a strong justification for the present study, which seeks to contribute to the existing literature by examining technostress as a central mechanism linking digital workload to psychological well-being among employees working in Saudi smart healthcare systems.

2.2.6 Psychological Well-being

Psychological well-being is one of the most important determinants of employee health and organizational effectiveness in modern day work. In recent decades, organizations have become more aware that employees are not just physically ill or emotionally disabled; they are emotionally healthy, resilient, happy, and able to cope with work. In healthcare, psychological well-being is especially important because a high level of responsibility, emotional labor, complex decision-making, and constant patients' distress mean that healthcare professionals are very well aware of themselves and are always in the way of keeping themselves well. Psychologists and healthcare practitioners in healthcare have a lot of interest in psychological well-being at the same time as the digital revolution of healthcare has made healthcare professionals very technologically exposed. The rise of electronic health records, hospital information systems, telemedicine platforms, digital communication, and electronic performance monitoring systems has altered work life for healthcare workers from a cognitive experience perspective, electronic documentation, and constant engagement with digital technologies. There are positive aspects of those innovations in healthcare quality as well as in process efficiency, but also new occupational hazards in the form of mental health concerns, which can affect employees. Psychological well-being is viewed as one of the most important outcome variables to be considered in

the human impact of digital transformation in healthcare organizations. Psychological well-being is the condition of good psychological functioning, which is defined as having positive emotions, a good feeling for people, good relationships, and being able to deal with life problems in their personal and professional lives. Psychological well-being is not limited to psychological disorders and is an approach to mental health that is positive in a sense of personal development, personal health, emotional health, self-acceptance, and life satisfaction (Ryff, 1989). Psychological well-being is positively connected to the ability to achieve personal potential (the ability to create meaningful social circles and relationships) and to have positive emotions in a difficult situation. Psychological well-being takes into account both hedonic well-being (the ability to be happy and satisfied) and eudaimonic well-being (personal growth, life satisfaction, purpose in life, independence, and self-realization). These two perspectives are complementary, and psychological well-being is what people can do in life, and the way we have to do it is the ability to feel good and to feel happy and to work well. Psychological well-being in an organization is the ability to function in the job that you are doing and have good job security and feel good at doing it and good at a job. Psychologically healthy work colleagues will have a high level of activity and commitment to the organization, be more productive, and have better relations with colleagues and clients. Conversely, a lack of psychological well-being may manifest as emotional fatigue, anxiety, depression, burnout, poor work performance, and absenteeism.

World Health Organization Definition. Mental health is the state of mental being: “It is what allows us to live, to do well and to contribute to our community” (WHO, 2022). Mental health is not just the absence of mental illness, but the ability to overcome everyday life challenges and remain healthy in a healthy way. Psychological well-being is to be developed and is characterized by numerous linked dimensions such as emotional resilience, stress management, effective work performance, good social relationships, and active participation in society. People with good psychological well-being will function at work, cope with stressors, perform well in life, and be strong members of society. It is in the world of healthcare and healthcare workers that this is more of an important topic because professionals are often very emotionally demanding in clinical situations and face very high levels of work pressure. Psychological well-being allows healthcare workers to provide safe, compassionate, and effective care for their patients and to keep their professional performance and, in turn, their own health.

WHO-5 Well-Being Index. The World Health Organization Five Well-Being Index (WHO-5) is one of the most popular and well-known psychological well-being instruments. The WHO-5, created by the WHO Regional Office for Europe, is a short and simple, reliable, and well-developed self-report instrument in order to measure positive psychological well-being rather than psychological distress (Topp et al., 2015). Its simplicity, psychometric advantages, and ability to be applied to a wide range of populations are the reasons why the WHO-5 has become one of the most widely used measures of well-being in healthcare research. The WHO-5 consists of five positively worded statements of subjective feelings in the previous two weeks that discuss people’s feelings of being happy and in good spirits, calm and relaxed, active and vigorous, refreshed upon waking, and interested in life. The participants rate each statement on a six-point Likert scale from 0 (At no time) to 5 (All of the time). The raw score is 0 to 25 and is multiplied by four to produce a standard score from 0 to 100, with higher scores indicating better psychological health. The WHO-5 is extremely reliable and well-suited for cultural and occupational contexts, such as health professionals. It is also translated into

many languages and has been validated in many different populations and can be used for international comparative research. Since it is oriented towards positive well-being and not psychological symptoms, it is a very relevant instrument that aligns closely with the present-day perspective of positive mental health and resilience, not just psychopathology. For this reason, we have chosen the WHO-5 as the main instrument to measure psychological well-being in this study.

Psychological Well-being dimensions. Although psychological well-being is measured using the WHO-5 in this study, the psychological well-being in the general culture is described as being multidimensional in nature as it is the combined aspects of many dimensions. Ryff's influential model (1989) describes six dimensions of psychological well-being. The first dimension is self-acceptance, which is the positive assessment of oneself and one's experiences. A person who is self-aware recognizes and values themselves and what they have to offer and acknowledges how they are good at their area (confidence level) and can be judged by others as being able to do well and succeed. The second dimension is good relationships with others. Workplace relationships are about building positive, trusting and fulfilling relationships with others. Cooperation among multiple teams is so important in healthcare organizations to keep both employees happy and patients happy. The third dimension is autonomy, which is a strong sense of independence and control over one's actions and behavior and how we resist the external pressure for better job satisfaction and psychological toughness. The fourth dimension is environmental mastery, which means a person's ability to take care of his environment and respond well to change. In the world of digital healthcare, environmental mastery is the ability of the people to navigate technological changes as well as digital systems to work well despite increasing complexity in the workplace. The fifth dimension is the purpose of life, based on the sense that we all live and work as important and the purpose of our life is to find happiness in life. In healthcare practitioners' lives, long-term mental health is often derived from the good work that they do for our health and well-being. The sixth dimension is personal development and the development of new skills. As healthcare organizations continue to modernize with technology, professional development and digital skills acquisition will become increasingly important for the well-being of staff. Psychological well-being in healthcare organizations is a key determinant of enterprise functioning in healthcare and it has been recognized as one of the most important determinants of healthcare organization performance. Well-being in the lives of health professionals has been shown to translate into better performance for all. Healthcare professionals who are socially and physically healthy and well-oriented and work hard are more resilient to work stress and are able to communicate better with their colleagues and patients so that we can offer them better healthcare services. On the other hand, poor psychological health can be very debilitating for healthcare workers and healthcare organizations. People with chronic occupational stress are more likely to suffer from emotional fatigue, burnout, anxiety, depression, sleep disturbances, reduced work engagement (e.g., absenteeism) and turnover intentions. The negative effects can affect clinical judgment and, therefore, medical errors, patient satisfaction and quality of healthcare. Healthcare organizations are coming to understand that employee psychological health is a big part of good management and patient safety and so they need psychological well-being to be a part of their culture. Digital transformation has increased the importance of psychological health because healthcare professionals now have to balance the clinical work of having a patient and the digital work of having a person on their side. The

cognitive effort for digital systems, electronic documentation and constant technological change can be psychologically stressful for people if there are insufficient resources at the organizational level to deal with them. Thus, understanding the factors associated with psychological well-being has become essential to designing a healthier digital workplace where technology and workforce strength are both supported and the workforce is on the rise.

Previous Studies on Psychological Well-being

A substantial body of international research has examined psychological well-being among healthcare professionals and consistently identified occupational stress, workload, organizational support, leadership, work-life balance, and job satisfaction as important determinants of employee well-being. Recent studies have demonstrated that healthcare professionals experiencing greater occupational stress frequently report lower psychological well-being, increased burnout, emotional exhaustion, and reduced organizational commitment (Maslach & Leiter, 2016). Similarly, research has shown that supportive organizational environments, effective leadership, professional development opportunities, and positive workplace cultures contribute significantly to improved psychological well-being among healthcare employees.

More recent studies focusing on digital healthcare environments suggest that increasing digital workload and technostress may negatively influence employees' psychological well-being by increasing cognitive demands, emotional fatigue, and workplace stress. However, evidence also indicates that adequate organizational support, comprehensive digital training, and user-friendly technological systems can mitigate these negative effects and promote healthier adaptation to digital transformation. Despite the growing international literature, empirical research examining psychological well-being in relation to digital workload and technostress within Saudi healthcare organizations remains limited. Most previous Saudi studies have concentrated on burnout, job satisfaction, or general occupational stress rather than investigating psychological well-being as a distinct construct using validated instruments such as the WHO-5 Well-Being Index. This gap in the literature further justifies the present study, which seeks to examine psychological well-being as the primary outcome variable within a comprehensive model linking digital workload, technostress, and organizational support among employees working in Saudi smart healthcare systems.

2.2.7 Organizational Support

Organizational support is one of the most important concepts in organizational behavior and human resource management because of the impact it has on employee attitudes, psychological well-being, job performance, and organizational commitment. With the increasing organization and technology-driven environment, employees are frequently faced with new challenges such as organizational change, technological change, high demands, and demanding work. It is in this setting that organizational support will help employees to make a successful transition to the new work environment while at the same time maintaining high levels of motivation, job satisfaction, and psychological well-being. Given the high responsibility and emotional labor in healthcare as well as the constant technological progress, organizational support is very much a necessity for employees to be able to remain resilient and effectively implement digital transformation programs. The

digitalization of healthcare has intensified the need for it as well. Healthcare professionals will be required to adapt not only to electronic health records, hospital information systems, telemedicine platforms, artificial intelligence applications, electronic communication technologies, and various digital reporting systems that will develop over time. These technological advancements are certainly good for health and business, but they also force healthcare workers to learn new skills, adjust their work routine, and cope with increased digital demands. Without adequate organizational support, employees can experience more technostress, less job satisfaction, emotional strain, and less psychological well-being. Organizational support is an important resource for successful digital transformation and minimizing the negative psychological impact of a technology-dependent work environment. Organizational support is the perception of the company in terms of the level of dedication employees get from the organization, how much they value their efforts in terms of their work, and how much they care about them. In general, employees believe the organization is to support them in all aspects in terms of fair treatment, resources, leadership support, opportunities for professional development, and support for their physical and mental health (Eisenberger et al., 1986). Employee support is what they feel is good for them as it makes them feel appreciated by the organization and is in line with their work, as well as can make for a positive professional life and good work environment. The level of organizational support is not only monetary but also consists of many other organizational practices that work for their employees too, such as good leadership, good communication, recognition of how much they excel, career development opportunities, decision-making, equitable human resources, technical support, continuous professional development, and psychological support. Together, these organizational behaviors have the effect of creating a sense of importance by the employees who are in the organization that they are important employees. In healthcare organizations, organizational support is more important, as healthcare workers are often dealing with emotional demands, complex clinical responsibilities, and heavy workloads, as well as rapidly changing technological environments. Healthcare workers who perceive strong organizational support are more likely to cope with workplace stress, adapt to changes in the organization, and remain psychologically stable in their work environments. The theory of organizational support is based on Perceived Organizational Support (POS) theory as developed by Eisenberger and colleagues (1986). The theory posits that employees have general concepts about how much their organization values their contributions and cares for their well-being based on the day-to-day interactions with organizational policies, leaders, supervisors, and management. This affects employee attitudes, behaviors, motivation, and organizational commitment. In POS theory, employees perceive their organization to be a social entity that is responsive to their needs. When the company treats its employees well—with its policies being supportive and its management ethical—employees feel a sense of responsibility to do more for the organization, to work hard, and to contribute to organizational success. On the other hand, employees who lack support from the organization might be unhappy, less motivated, less committed, and more likely to leave the organization. POS Theory is derived from Social Exchange Theory, which states that the relationships between employees and organizations are based on resource exchanges, trust relationships, and shared commitment (Blau, 1964). Organizations that invest in employee welfare with supportive practices can motivate employees to return loyalty, commitment, and performance. Organizations with very low levels of support might sap their employees'

psychological attachment to the organization and reduce their capability to do more than what is required to be good at their job. POS theory is relevant to healthcare organizations in the age of digital change and provides an explanation for the way employees deal with technological change. Healthcare professionals who feel that their organization is equipped with sufficient digital training, technical support, effective leadership, and technological resources are likely to adjust to digital systems and are less prone to technostress. Thus, perceived organizational support functions as a protective mechanism to reduce the negative effects of digital workload overload. The various types of support that employees receive in terms of work experience and psychological well-being are under different circumstances. One of the most important supports is supervisory support, or the guidance, encouragement, recognition, and help of immediate supervisors and the leaders of the organization. Supportive supervisors help employees solve problems at work, provide constructive feedback, facilitate communication, and create a working atmosphere characterized by trust and mutual respect, which fosters productive collaboration. In the healthcare sector, positive leadership is positively associated with high employee satisfaction, less burnout, and a better level of commitment from employees to the organization. A second type of support is technical support, which has become valued in the context of digitalized healthcare. Technical support comprises assistance with software applications, troubleshooting technological problems, system maintenance, help-desk services, and ongoing technical guidance. Technical support is a significant part of digital healthcare, enabling professionals to work confidently with digital systems and minimizing disruptions caused by technological difficulties. High technical assistance is generally reported to cause less technostress and increase confidence in healthcare information technologies. Training and professional development are also important. It is the continued education of the staff that teaches them digital skills that they need to work in a technologically demanding environment. Training programs enhance employees' technical knowledge, increase confidence in using digital systems, decrease uncertainty regarding technological development and support successful adoption of technology. Professional development also helps employees to believe that the organization cares for their career development in what they do the most. There is also psychological and emotional support of healthcare organizations and health care providers. With the rise in mental health support for employees (employee support programs, counseling, stress management programs, peer support programs, mental health services, etc.) at healthcare organizations we can see the need for more mental health support but also in the professional environment. This kind of program helps with employee resilience and work experience and mental health and reduces work stress and the psychological effects of being in a demanding work environment. Organizations also provide help in terms of staff levels, workload distribution, and communication systems along with modern technological infrastructure and fair workplace policies. In the end, a participative approach to decision-making is a great way to support organizations and employees' cooperation with management and decision-making is an important form of organizational support because it helps to have them participate in the organizational decisions that affect their work. Collaborative decision-making enables employees to support in the design and implementation of technology, and a more positive impact on customer acceptance and trust in organizations' decision-making and decision-making support for new technologies in the preparation and implementation of new technologies is reinforced by the involvement of employees in

technology and organizational trust and commitment of people into change work and innovation. If healthcare organizations are to embrace digital transformation and implement a change, in healthcare organizations implementing digital transformation, involvement of healthcare professionals in the process of selecting technology adoption, workflow and system design, technology implementation, and system evaluation will help to ensure the successful implementation and decrease resistance to change as well as resistance to change in the healthcare system when they are implementing digital transformation efforts.

Organizational Support in Healthcare Settings

Organizational support has particular importance within healthcare organizations because healthcare professionals routinely encounter complex clinical responsibilities, emotionally demanding patient interactions, long working hours, workforce shortages, and continuous organizational change. These occupational challenges require healthcare organizations to establish supportive working environments that promote employee well-being while maintaining high standards of patient care.

The rapid expansion of digital technologies has further increased the importance of organizational support within healthcare settings. Healthcare professionals must continuously adapt to electronic health records, computerized physician order entry systems, digital imaging platforms, telemedicine services, electronic prescribing systems, and numerous administrative technologies that have become integral components of healthcare delivery. Successfully adapting to these technologies requires not only individual competence but also organizational environments that provide appropriate training, technical assistance, leadership support, and sufficient technological resources.

Research consistently demonstrates that healthcare employees who perceive stronger organizational support experience lower levels of occupational stress, greater psychological well-being, stronger work engagement, and higher organizational commitment. Organizational support also improves employees' willingness to adopt new technologies, enhances digital competency, reduces resistance to technological change, and facilitates successful implementation of digital health initiatives. Conversely, inadequate organizational support has been associated with higher levels of technostress, burnout, emotional exhaustion, and reduced job satisfaction among healthcare professionals.

Within the framework of the present study, organizational support is conceptualized as a moderating variable that influences the relationship between digital workload and technostress. Consistent with the Job Demands–Resources (JD–R) Model, organizational support represents an important organizational resource capable of buffering the adverse effects of increasing digital demands. Healthcare employees who receive adequate organizational support are expected to experience lower levels of technostress despite exposure to similar levels of digital workload because organizational resources strengthen employees' ability to cope effectively with technological challenges.

Overall, organizational support represents a fundamental organizational mechanism for promoting employee well-being, facilitating successful digital transformation, and improving organizational performance within healthcare settings. As healthcare organizations continue expanding their reliance on smart healthcare technologies, establishing supportive organizational environments will become increasingly important for

ensuring that technological innovation enhances both healthcare quality and employee well-being. Consequently, examining organizational support within the present study provides valuable insights into strategies that healthcare organizations can adopt to reduce technostress, strengthen psychological well-being, and support sustainable digital transformation in Saudi smart healthcare systems.

2.2.8 Relationship between Digital Workload and Technostress

The relationship between digital workload and technostress has become an important topic in organizational behavior, information systems, and healthcare research. As organizations increasingly depend on digital technologies, employees are required to perform more of their daily tasks through electronic systems, digital communication platforms, and information technologies. Although these technologies improve productivity and organizational efficiency, they also increase the cognitive and psychological demands placed on employees. Consequently, digital workload is widely recognized as one of the main factors contributing to technostress, particularly in technology-intensive environments such as healthcare.

Digital workload refers to the cognitive and operational demands associated with continuous interaction with digital technologies, including electronic documentation, information processing, digital communication, software navigation, and adapting to technological change (Tarafdar et al., 2015). Technostress, in contrast, is the psychological strain experienced when employees perceive that technological demands exceed their skills or available resources (Tarafdar et al., 2007). As digital workload increases, employees may become mentally overloaded, making them more vulnerable to technology-related stress.

This relationship is supported by the Job Demands–Resources (JD–R) Model, which suggests that excessive job demands consume employees' cognitive, emotional, and physical resources, increasing workplace stress and reducing well-being (Bakker & Demerouti, 2007). In healthcare, digital workload represents a growing job demand because healthcare professionals must continuously interact with multiple digital systems while performing complex clinical duties. When these technological demands become excessive, employees may experience cognitive overload, reduced efficiency, and higher levels of technostress.

The Technostress Model proposed by Tarafdar et al. (2007) further explains this relationship by identifying five technology-related stressors: techno-overload, techno-complexity, techno-invasion, techno-insecurity, and techno-uncertainty. Many of these stressors arise directly from increasing digital workload. For example, extensive electronic documentation contributes to techno-overload, managing multiple software applications increases techno-complexity, continuous electronic communication encourages techno-invasion, and frequent software updates create techno-uncertainty as employees must constantly adapt to new technologies.

Healthcare organizations provide an ideal setting for examining this relationship because healthcare professionals rely heavily on electronic health records, computerized physician order entry systems, laboratory and radiology information systems, electronic prescribing platforms, workforce management systems, and digital communication tools. Although these technologies improve healthcare quality and organizational efficiency, they also increase employees' cognitive workload by requiring constant attention, multitasking, and continuous technological adaptation.

One of the primary mechanisms linking digital workload to technostress is information overload. Healthcare professionals process large volumes of digital information every day, including laboratory results, imaging reports, medication alerts, emails, electronic messages, quality indicators, and administrative notifications. Managing these information streams while making complex clinical decisions under time pressure increases cognitive demands and may exceed employees' processing capacity, leading to mental fatigue and technology-related stress.

Another contributing factor is the electronic documentation burden. While electronic health records have improved documentation and continuity of care, research indicates that healthcare professionals spend a considerable amount of time documenting patient information rather than providing direct patient care. Additional documentation after working hours further increases digital workload and contributes to technostress, emotional exhaustion, and burnout.

Continuous technological change also strengthens this relationship. Healthcare organizations regularly introduce software updates, new digital applications, revised documentation procedures, and enhanced information systems. Although these developments improve healthcare services, they require employees to continually learn new technologies and modify established work practices. Frequent technological changes increase uncertainty and cognitive effort, making adaptation more demanding and intensifying technostress.

Empirical evidence consistently supports a positive relationship between digital workload and technostress. Tarafdar et al. (2015) found that employees experiencing higher digital workload also reported significantly higher technostress due to increasing technological demands and information overload. Similarly, Molino et al. (2020) reported that digital workload significantly predicted technostress and was associated with greater emotional exhaustion and lower work engagement.

Within healthcare, Khairat et al. (2020) demonstrated that extensive use of electronic health records increased physicians' cognitive workload and technology-related stress by expanding documentation requirements and reducing time available for direct patient care. Likewise, La Torre et al. (2020) concluded that increasing digital demands consistently contributed to technostress, burnout, and emotional exhaustion among healthcare professionals.

Research conducted during the COVID-19 pandemic further reinforced these findings. The rapid expansion of telemedicine, virtual consultations, and digital communication significantly increased healthcare professionals' reliance on technology. As digital demands intensified, many employees experienced higher digital workload and technostress, highlighting the psychological challenges associated with rapid digital transformation.

Despite strong international evidence, relatively few studies have examined the relationship between digital workload and technostress in Saudi healthcare organizations. Existing research has focused primarily on technology adoption and digital health implementation, with limited attention to the psychological effects of increasing digital work demands. Furthermore, few studies have investigated this relationship while considering the moderating role of organizational support. Given the continued expansion of smart healthcare systems under Saudi Vision 2030, understanding this relationship has become increasingly important.

Based on the theoretical perspectives and empirical findings reviewed above, the present study proposes that digital workload is a significant predictor of technostress among employees working in Saudi smart healthcare systems. As healthcare professionals become more dependent on digital technologies to perform clinical and administrative tasks, increasing digital workload is expected to elevate technostress unless supported by adequate organizational resources. Understanding this relationship will help healthcare organizations develop strategies that reduce technology-related stress while supporting employee well-being and sustainable digital transformation.

2.2.9 Relationship between Technostress and Psychological Well-being

The relationship between technostress and psychological well-being is one of the most widely studied issues in organizational behavior, occupational psychology, and healthcare management, especially with organizations increasingly utilizing digital technology to operate. Digital transformation has brought about a significant improvement in organizational efficiency, communication, and decision-making, but it also has introduced psychological challenges for the way people are exposed to information and communication technologies (ICTs) in continuous interaction. Technostress is one of the main psychosocial risks associated with digital work, and as time passes and more people deal with technology-related stress, the psychological health of the staff may suffer, along with their emotional state and the quality of their working life. Psychological well-being means maintaining positive emotion and feeling in a work environment, working well, and living a life of health and productivity (World Health Organization [WHO], 2022). In contrast to technostress, technostress is the psychological strain of employees having to cope with digital overload, technological complexity, continuous connectivity, rapid technological change, and increased digital load (Tarafdar et al., 2007). The relationship between the two is generally negative, and technostress is associated with lower psychological well-being and worse mental health issues. The Job Demands–Resources (JD–R) Model states that job demands take a toll on employees' physical, cognitive, and emotional well-being, leading to fatigue, depression, and a lack of mental improvement (Bakker & Demerouti, 2007). Thus, technostress is a psychological response to technology overload and technological change in a workplace where employees do not have enough mental resources to cope. When adequate organizational resources are unavailable in the workplace, this is associated with lower psychological well-being, emotional exhaustion, and the risk of burnout. Similarly, the Conservation of Resources (COR) Theory provides another explanation that technostress is detrimental to psychological well-being. According to Hobfoll (1989), people want to protect, acquire, and manage their personal resources, such as energy, time, emotional stability, and psychological capacity. If these resources are threatened or depleted, stress will be felt. Continuous interactions with technology and technology-related demands require employees to invest significant cognitive and emotional energy in learning new technologies, solving tech problems, and coping with digital communication and electronic challenges. If this resource is depleted over time, psychological well-being becomes affected by fatigue, anxiety, frustration, and emotional distress. Psychological well-being in healthcare is particularly important as healthcare professionals, who work in environments characterized by high responsibility and time pressure, emotionally demanding patients, and the need for complex clinical decisions, are subjected to technostress. Digital transformation has brought more responsibilities, such as electronic health records (e.g., computerized physician order entry), digital imaging

systems, telemedicine applications, electronic prescribing systems, and so on. These digital systems enhance the quality of healthcare and provide employees with a comfort zone, but the technology-based stressors associated with them also put them at risk of psychological stress. One of the main ways that technostress influences psychological well-being is through emotional exhaustion. Most people experiencing frequent technology-related stress report feelings of fatigue, frustration, diminished motivation, and emotional exhaustion. Constant technological disruptions, information overload, and continuous adaptation to the changing digital environment of the workplace have a significant psychological impact, leaving employees unable to cope with work-life balance. Emotional exhaustion is one of the early signs of psychological decline and is well known to cause burnout in healthcare workers. Digital technologies enable people to remain in constant touch with their work and family through smartphones, electronic messaging systems, email, and other media. Continuous connectivity increases organizational responsiveness but also makes work and personal life more intertwined. Employees may feel obligated to respond to work-related communications outside of work hours, which can increase stress and negatively impact their psychological health. Connectivity has been associated with poor sleep quality, anxiety, emotional fatigue, and reduced life satisfaction, all of which contribute to declining psychological well-being. Technostress can also negatively affect employees' perceptions of competence and professionalism in the workplace, leading them to feel inadequate. Healthcare workers often struggle to adapt to rapidly changing technology and may experience feelings of insecurity, reduced confidence, frustration, and self-doubt while working in a medical field. These negative emotions can gradually erode employees' motivation, job satisfaction, and overall psychological functioning. Frequent technical failures, software usability issues, and inadequate technical support can compound these experiences, making employees feel as though they are losing control over their work environment. Healthcare professionals are especially vulnerable to these psychological effects because technological demands coincide with their clinical duties. Physicians, nurses, radiographers, pharmacists, and other healthcare professionals must provide safe patient care while managing complex digital documentation, responding to clinical alerts, interpreting electronic information, and navigating various healthcare information systems. Consequently, technostress may amplify existing occupational stressors, increasing the likelihood of emotional exhaustion and reduced psychological well-being. A growing body of empirical research supports the negative relationship between technostress and psychological well-being. La Torre et al. (2020) conducted a systematic review of technostress among healthcare professionals and found that higher levels of technostress were consistently associated with increased emotional exhaustion, reduced job satisfaction, greater burnout, and poorer psychological health. The review emphasized that healthcare professionals working within highly digitalized environments frequently experience significant psychological strain due to increasing technological demands and extensive electronic documentation requirements. Similarly, Tarafdar et al. (2015) reported that employees experiencing higher levels of technostress demonstrated lower work satisfaction, reduced organizational commitment, and poorer psychological well-being. They reported that technology-related stress negatively affects employees' emotional functioning by increasing frustration, reducing motivation, and impairing work engagement. Molino et al. (2020) similarly reported that technostress was linked to emotional fatigue and reduced psychological health status for employees in technology-

intensive organizations. Healthcare research has also shown similar results. Khairat et al. (2020) reported that physicians who have increased technostress from electronic health record usage have also exhibited greater cognitive fatigue, frustration, and emotional exhaustion. This research found that technologically demanding work also reduced physicians' satisfaction and the opportunities for real patient engagement. A number of other studies have also shown that technology overload, information overload, and electronic documentation overkill lead to burnout, anxiety, and psychological health problems in healthcare professionals. The psychological impact of technostress was also highlighted in the COVID-19 pandemic. Telemedicine, remote healthcare, digital communication, and virtual clinical consultation increased healthcare professionals' reliance on digital technologies. They found that the sudden increase in digital workload and continuous reliance on technology resulted in increased technostress, increased emotional fatigue, and decreased psychological well-being in the healthcare workers. These findings further stressed the importance of technology-related stress as a key component of occupational health strategies in the digitally changing healthcare sector. Despite the growing international literature, there is little research to investigate the relationship between technostress and psychological well-being in Saudi healthcare institutions. The existing literature mainly focused on the adoption of technologies, healthcare information systems, and digital health, and little to no research has been devoted to the psychological impact of technology-related stress on the professionals who deal with it. Furthermore, few studies in Saudi Arabia have investigated these relationships with psychometric tools to date, such as the Technostress Creators Scale and WHO-5 Well-Being Index. This gap in the literature underscores the need for further empirical research in Saudi healthcare practices where healthcare organizations continue to invest in ambitious digital transformation efforts in line with Vision 2030. Based on the theoretical perspectives and empirical evidence we reviewed above, we contend that technostress has a negative impact on employees' psychological welfare and well-being in Saudi smart healthcare systems, and we believe that with increasing technological demands on healthcare workers, high levels of technostress will lower psychological functioning, emotional resilience, and overall well-being. This relationship is crucial for developing organizational strategies to support healthcare workers in the face of digital transformation, to build workforce resilience, and to make sure that all departments are able to remain successful and serve the needs of patients.

2.2.10 Moderating Role of Organizational Support

The moderating role of organizational support is increasingly studied in organizational behavior, human resource management and information systems research as something that can reduce the negative impact of workplace stressors on employees' psychological and behavioral performance. As organizations are going through a rapid digital transformation process, employees are more and more inundated with technology-laden work demands, which may surpass their resources and coping capacity. Of course digital technologies contribute a lot to business efficiency and productivity. But they also bring in new types of working stress in the form of increasing digital workload, technological change and complex information systems. Because of this, organizational support has emerged as an important resource in changing the work environment to the best of our ability for employees to cope with technology-based stress. Organizational support is important in

healthcare organizations as staff must balance complex clinical duties with digital demands. The integration of electronic health records, hospital information systems, telemedicine platforms, artificial intelligence applications, digital communication technologies and electronic workforce management systems with healthcare work has transformed healthcare. While these technologies have improved the quality of healthcare and the efficiency of healthcare, they also make healthcare workers more involved in digital systems and thus they are more likely to experience higher digital workload and technostress. As a result, it is often suggested that organizational support can be a moderating variable by decreasing the impact on digital workload and technostress. The effect of a moderating variable is to determine the direction or strength of the relationship between an independent variable and a dependent variable. In this study, organizational support is seen as a moderator between digital workload and technostress. As a result, employees who perceive high levels of organizational support will have lower levels of technostress than employees with less organizational support because they face similar levels of digital workload. In other words, we expect organizational support to reduce the positive relationship between digital workload and technostress, by providing employees with the organizational resources to cope better with increasing technological demands. The mechanism for this moderating effect is based on the Job Demands–Resources (JD–R) Model (Bakker & Demerouti, 2007). Job demands in all professions are physical, cognitive or emotional, but they are also job resources that help employees to work hard, reduce job demands and develop as a person. Job demands can get more and more difficult for employees as they are overburdened so much that they become tired, emotional and just not able to cope. But enough job resources can help buffer the negative effects of such high job demands and provide more resilience, motivation and coping skills for employees. In the world of digital healthcare, digital workload is a new job requirement, with healthcare staff being required to be more involved in a vast amount of electronic records, working with multiple information systems and dealing with digital information and constantly changing technology. On the other hand, organizational support is a very important job resource as it offers employees training, technical assistance, leadership support, technology and psychological support to manage digital work. According to the JD–R Model, workers who have more supportive organizations should have less technostress even if they are still working with high digital workloads. Organizational support moderating can also be explained by Perceived Organizational Support (POS) Theory, developed by Eisenberger et al. (1986). POS Theory explains that employees who think the organization values their work, cares for them and supports them are more committed to their work, more likely to work and more likely to feel that they will succeed. In the situation of an organization that cares about employees (with enough resources, technical support, professional development opportunities and supportive leadership) they are more likely to think of technological change as manageable and not dangerous. It is this type of organizational support that may help to reduce employees' psychological reaction to increasing digital workload by building their confidence and diminishing uncertainty that technology is being used. Organizational support is seen as an external resource in Conservation of Resources (COR) Theory (Hobfoll, 1989) and is an important resource for employees to utilize when working in demanding work environments where mental health, emotional and cognitive resources are not taken into account. Digital workers who are working with high digital workloads must have to put in a lot of time and effort to learn new technologies, solve technical problems,

manage electronic data and evolve and be able to adapt to changing digital systems. Without sufficient organizational support, those constant demands can drain employees' resources and create technostress. But with proper training, technical assistance, hands-on and helpful technology, and supervision and support from the organization, employees are better equipped to use their life savings and can handle digital work. There are some organizational processes that can help the moderating role of the support by organizations in the digital healthcare industry. Digital training and competency development is one of the most important mechanisms. Digital training programs can equip healthcare professionals with high technological knowledge, be confident in using the technology and reduce anxiety when working with unfamiliar technology. Digitally educated employees are more technologically self-efficacious and less prone to technostress in a high-stress business environment. And it is also important to have technical support to do that. Healthcare workers often encounter software problems and system interruptions, interoperability problems, and technological issues that can also cause frustration and cognitive demands. And when technical support is available to employees who can quickly resolve technical issues, no one has to work through them and technological stress is lessened. Technical support is also timely and workers will have a positive impression of the organization that is working for them during digital transformation. Supportive leadership is a second part of the support. When leaders are in sync, they work with employees to make the technological decisions, they acknowledge the work of employees to help them, they are helpful; an environment of trust and psychological safety is established. In healthcare organizations, supportive leaders are able to implement digital technologies by listening to employees, encouraging continuous learning, and collaborating with each other in this rapidly changing technology era. The design and usability of digital systems also play a role in the effectiveness of organizational support. By integrating efficient software systems with clinical workflows, employees are less cognitively stressed and can be more likely to accept digital technologies. However, poorly designed software applications with too much navigation, too much documentation, or too much operational work will increase the digital burden and reduce the protection of the organization. As a result, healthcare organizations should consider usability and workflow integration in implementing new digital systems. A growing body of empirical research supports the moderating role of organizational support in reducing technology-related stress. Tarafdar et al. (2015) showed that organizations that offer the most technological support, training employees, and communication effectively reduced employees' perceptions of technostress despite the increase in technology demand. Ragu-Nathan et al. (2008) also showed that organizational mechanisms such as literacy support, technical support, and employee engagement reduced the negative impact of technostress creators on employee lives. Healthcare professionals who are more supported have been found to experience lower levels of emotional fatigue, burnout, and technology stress in the workplace compared to less supportive ones. The companies that invest in digital competency, technological support, and positive leadership have been shown to increase employees' acceptance of technology, psychological well-being, and the success of systems implementing healthcare information. Furthermore, organizational support has been shown to enable employees to feel confident in using digital technology and reduce the risk of high technostress by increasing the digital workload level. Despite these encouraging findings, relatively little research has been conducted on the moderating effect of organizational support in Saudi

healthcare organizations. In most previous work, the role of organizational support on job satisfaction, organizational commitment, or employee performance has been examined without considering its role in reducing the psychological effects of digital transformation. Moreover, few empirical studies have evaluated digital workload, technostress, psychological well-being, and organizational support in a comprehensive theoretical model. As Saudi healthcare organizations continue to adopt sophisticated smart healthcare technologies under Vision 2030, understanding the buffering role of organizational support is crucial to promote sustainable digital transformation and protect the psychological well-being of healthcare workers. Based on the theoretical perspectives and empirical data we have discussed above, this study suggests that organizational support can substantially reduce the link between digital workload and technostress among employees of Saudi smart healthcare systems. In fact, healthcare workers who feel that the organizational support is more supportive are likely to experience lower levels of technostress even though they are under similar digital workload. By illustrating the protective role of organizational support, our study aims to provide practical recommendations to healthcare organizations to create a supportive work environment that can increase the resilience of the workforce, reduce technology-related stress, and ultimately make the successful digital transformation program come out of the pipeline.

Empirical Studies

Empirical studies provide valuable evidence for understanding the relationships among digital workload, technostress, psychological well-being, and organizational support in healthcare organizations. Over the past two decades, increasing digitalization has encouraged researchers to examine not only the operational benefits of digital technologies but also their impact on employees' psychological health and organizational outcomes. Although digital transformation has improved healthcare quality, accessibility, and efficiency, it has also introduced challenges such as digital workload, technostress, burnout, and emotional exhaustion. Consequently, researchers have emphasized the need to identify organizational strategies that maximize the benefits of digital technologies while minimizing their negative effects on healthcare professionals.

This section reviews relevant empirical studies in three categories: international studies, Middle Eastern studies, and Saudi Arabian studies. It concludes by identifying the research gaps that justify the present study.

International Studies

International research has extensively examined the psychological effects of digital transformation across various industries, including healthcare. One of the most influential studies was conducted by Tarafdar et al. (2007), who introduced the Technostress Creators Framework and identified five major sources of technostress: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. Their findings showed that increasing technological demands contributed to higher stress levels, lower job satisfaction, and reduced organizational commitment, providing a strong theoretical foundation for later research.

Building on this work, Tarafdar et al. (2015) demonstrated that organizational interventions such as technical support, employee training, and digital literacy programs significantly reduced technostress and increased employees' confidence in using digital technologies. Similarly, Molino et al. (2020) found that digital workload positively predicted

technostress, which in turn reduced work engagement and increased emotional exhaustion among employees working in highly digitalized organizations.

Within healthcare, Khairat et al. (2020) reported that physicians spent a substantial amount of time using electronic health records, often exceeding the time devoted to direct patient care. Increased documentation requirements were associated with greater cognitive workload, frustration, emotional exhaustion, and lower professional satisfaction. Likewise, La Torre et al. (2020) reviewed international evidence and concluded that technostress among healthcare professionals was consistently linked to burnout, emotional exhaustion, lower job satisfaction, and poorer psychological well-being. The authors recommended improving system usability, strengthening organizational support, and providing continuous digital training to reduce technology-related stress.

Studies conducted after the COVID-19 pandemic further emphasized these findings. The rapid adoption of telemedicine, remote consultations, and virtual communication platforms substantially increased healthcare professionals' digital workload and technostress. Although digital technologies ensured continuity of healthcare services during the pandemic, they also highlighted the importance of organizational strategies that protect employees' psychological well-being during periods of rapid technological change.

Overall, international research consistently demonstrates that digital workload increases technostress, technostress negatively affects psychological well-being, and organizational support plays an important protective role. However, most of these studies have been conducted in North America, Europe, and East Asia, highlighting the need for evidence from other cultural and organizational contexts.

Middle Eastern Studies

Research on digital transformation and technology stress in the Middle East has been rising in the last decade because of the growing investments in digital healthcare infrastructure in the region. The Gulf Cooperation Council (GCC) has conducted extensive healthcare digitalization efforts to improve healthcare quality and accessibility, and corporate effectiveness. Researchers are now beginning to look at the organizational and psychological impact of these technological advances. Some Middle Eastern studies have explored the degree of acceptance of electronic health records, telemedicine, and healthcare information systems among healthcare professionals. They had generally positive views of digital technologies and still found many issues related to documentation demands, technological complexity, lack of training, and insufficient technical support. Healthcare professionals frequently appreciated the clinical advantages of digital systems but also experienced the increased workload in electronic documentation and digital communication. Also in Gulf countries, it is reported that organizations must provide support on digital transformation. Healthcare professionals with a comprehensive digital education, good leadership, and technical support experience greater confidence in using digital systems and lower technology-related stress. However, without organizational support, healthcare organizations in the Middle East often faced employee resistance to digital technologies, low acceptance of technology and more work-related stress. Despite this good work, there are very few Middle Eastern studies that have looked at digital workload and technostress with a full background on technology management, such as the Technostress Model or the Job Demands–Resources Model. Moreover, the majority of studies on technology adoption and implementation have focused on employees'

psychological health rather than the mental well-being of people in the midst of digital transformation. Hence, it remains to be explored how digital workload affects healthcare professionals in Middle Eastern countries.

Saudi Arabian Studies

Saudi Arabia has witnessed remarkable progress in healthcare digitalization during the implementation of Vision 2030, resulting in growing scholarly interest in digital health technologies and their organizational implications. Existing Saudi studies have primarily investigated electronic health record implementation, telemedicine adoption, healthcare information systems, artificial intelligence applications, digital health services, and patient satisfaction with electronic healthcare platforms. These studies generally conclude that digital transformation has improved healthcare accessibility, strengthened organizational efficiency, enhanced healthcare quality, and increased patient satisfaction.

Several Saudi studies have examined healthcare professionals' acceptance of electronic health records and identified perceived usefulness, ease of use, organizational readiness, and training as important determinants of successful technology adoption. Other studies have evaluated telemedicine services introduced during the COVID-19 pandemic and reported positive outcomes regarding healthcare accessibility and continuity of care. Additional research has investigated artificial intelligence applications within radiology and other clinical specialties, highlighting their potential to improve diagnostic accuracy and healthcare efficiency.

Although these studies have significantly contributed to understanding healthcare digitalization within Saudi Arabia, comparatively little attention has been directed toward the psychological experiences of healthcare employees working within digitally intensive environments. Few studies have investigated the concept of digital workload directly, and even fewer have examined technostress as a distinct multidimensional construct using validated measurement instruments. Research specifically exploring the relationship between digital workload, technostress, and psychological well-being among healthcare professionals remains scarce.

Furthermore, organizational support has generally been investigated in relation to employee satisfaction, organizational commitment, and leadership rather than as a moderating factor capable of reducing technology-related stress during digital transformation. Consequently, the combined relationships among digital workload, technostress, psychological well-being, and organizational support remain largely unexplored within Saudi healthcare organizations.

Research Gap

The review of previous studies highlights several important research gaps. First, although international research has established significant relationships among digital workload, technostress, and employee well-being, evidence from Saudi healthcare organizations remains limited. Most previous Saudi studies have concentrated on technology implementation, adoption, and service quality rather than the psychological effects of digital transformation.

Second, digital workload has rarely been examined as a distinct organizational construct. Existing research has focused primarily on general workload, occupational stress, or technology acceptance without addressing the unique cognitive and operational demands of digital work environments.

Third, few studies have investigated digital workload, technostress, psychological well-being, and organizational support within a single conceptual framework. Most have explored isolated relationships instead of examining the mechanisms through which digital transformation affects employees' psychological outcomes.

Fourth, although organizational support is recognized as an important organizational resource, limited research has examined its moderating role in reducing the impact of digital workload on technostress within healthcare settings.

Finally, many previous studies have relied on technology acceptance models or qualitative approaches without simultaneously using validated instruments to measure digital workload, technostress, and psychological well-being. The present study addresses these gaps by integrating the Technostress Model, the Job Demands–Resources (JD–R) Model, and the Technology Acceptance Model (TAM) within a comprehensive conceptual framework. Using validated measurement scales, it examines the relationships among digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. In doing so, the study contributes both theoretically and practically to the growing literature on digital transformation and employee well-being in healthcare.

2.3 Theoretical Framework

A theoretical framework provides the conceptual foundation upon which a research study is developed. It offers a systematic explanation of the relationships among the study variables and guides the formulation of the research hypotheses, conceptual model, data collection procedures, and interpretation of the findings. Theoretical frameworks enable researchers to explain why particular relationships are expected to exist by drawing upon well-established theories and empirical evidence. In organizational and healthcare research, theoretical frameworks are particularly important because they facilitate a comprehensive understanding of complex phenomena involving human behavior, organizational processes, and technological change (Creswell & Creswell, 2018).

The present study investigates the relationship between digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. As healthcare organizations continue to integrate advanced digital technologies into clinical and administrative operations, employees increasingly encounter new technological demands that may influence their psychological experiences and work performance. Understanding these relationships requires a multidimensional theoretical perspective capable of explaining how digital technologies affect employees, how occupational demands contribute to technology-related stress, and how organizational resources protect employees from the adverse consequences of digital transformation.

Accordingly, this study is underpinned by three complementary theoretical perspectives: Technostress Theory, the Job Demands–Resources (JD–R) Model, and the Technology Acceptance Model (TAM). These theories collectively provide a comprehensive explanation of the mechanisms through which digital workload contributes to technostress, how technostress influences psychological well-being, and why organizational support may reduce the negative effects of increasing technological demands. Together, these theoretical

perspectives establish the conceptual foundation for the proposed research model and support the development of the study hypotheses.

2.3.1 Technostress Theory

The technostress theory is the basis of the present study because it is a lucid explanation of the psychological effects of the increased use of information and communication technologies in organizational areas. The concept of technostress was first introduced by Brod (1984) and was characterized as a modern type of adaptation disorder that results from some individual's difficulty in handling new computer technology. Although the original idea was computer anxiety, technological developments widened and helped to explain the psychological impact of digital interaction on the human body. The best progress in the framework of the Technostress theory was made by Tarafdar et al. (2007), who suggested that technostress is a multidimensional construct that has five main technostress creators: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. These dimensions show how digital technology creates pressure in the workplace by increasing work hours and workers' lives and demands continuous learning and challenges in technology skills, and in which employees need to constantly adapt to a changing work environment. In healthcare, Technostress Theory is crucial because healthcare professionals in the market are increasingly dependent on digital records, hospital information systems, telemedicine platforms, artificial intelligence applications, digital communication systems, and lots of electronic administrative technologies in order to do their jobs. These technologies are good for the organization and the patients but increase the cognitive load on staff and technological requirements. Thus healthcare workers might feel more technostress when their digital needs are greater than their resources or their technological skills. In this research, we apply Technostress Theory to healthcare and argue that an increase in digital workload is directly responsible for more technostress for healthcare workers. With more work that digital workers spend time interacting with various digital systems, receiving electronic information, and adapting to technological changes in the workplace, they are more susceptible to technology-related stress. This theory is the main reason for the direct relationship between digital workload and technostress that we propose in this work.

2.3.2 Job Demands-Resources (JD-R) Model.

The second theoretical foundation for our study is the Job Demands-Resources (JD-R) Model developed by Demerouti et al. (2001) as well as expanded by Bakker and Demerouti (2007). The JD-R Model has become one of the most influential theoretical frameworks for understanding occupational stress, burnout, engagement, and psychological well-being in a variety of industry settings. Based on the JD-R Model, every occupation is characterized by two key work characteristics: job demands and job resources. Job demands are the physical, cognitive, emotional, or organizational aspects of work that are not only physically or mentally demanding, but also carry the psychological and physiological costs of working and are as a result of doing it and can be associated with high stress and work stressors. Job resources are organizational, social, or personal factors that help employees achieve their objectives, minimize job demands, develop and increase motivation and productivity, and job satisfaction. In our study, digital workload is characterized as a modern job demand that involves healthcare workers focusing heavily on electronic documentation, digital

communication, information processing, and technological adaptation. Digital demands are emotionally demanding and may cause high technostress levels when they exceed the employee's ability to cope with it. On the other hand, organizational support is a critical job resource, which can mitigate the ill effects of increasing digital demands on employees. Organizations provide them with encouragement, technical support, digital training, a good technological infrastructure, employee involvement in decision-making, and even a supportive environment. Based on the JD-R Model, these organizational resources buffer the adverse effects of excessive job demands by aiding employees in coping and in the development of psychological health. The JD-R Model is therefore the theoretical rationale for considering organizational support as a moderating variable in our study. Specifically, the model predicts that healthcare employees receiving higher levels of organizational support will experience lower levels of technostress than those who are exposed to similar digital workload. Thus, organizational support can weaken the positive relation between digital workload and technostress, while also mitigating the psychological toll on employees.

2.3.3 Technology Acceptance Model (TAM).

We shall now turn to the third theoretical perspective of our study, the Technology Acceptance Model (TAM) by Davis (1989). TAM is the most commonly used theory to explain employees' acceptance and use of information technologies. In this model, people's intention to use a technology is driven by two things: perceived usefulness and perceived ease of use. Perceived usefulness refers to whether people actually think that using a technology is going to help to perform better and be more productive in their jobs, and perceived ease of use refers to the extent to which people believe the technology can be used with minimal effort. If the technology is useful and easy to use, then people are more likely to accept it and integrate it into their daily work. In healthcare organizations, TAM has been a widely used theory to explain the acceptance of electronic health records (e.g., telemedicine platforms, computerized physician order entry systems, clinical decision support systems, mobile health apps) by healthcare professionals. Most studies have found that healthcare professionals are more likely to adopt digital technologies when they feel that they are helpful to the patient and easy to use. Although the present study does not focus on technology adoption solely, TAM offers a theoretical perspective on how employees' perception of the digital technologies affects their psychological responses to technological demands. The technological challenges experienced by the employees that are difficult to use and poorly designed or far too complex can increase the cognitive load and the level of technostress may be high. On the other hand, good-quality technologies integrated in clinical workflows can help to reduce the digital load on the workers, gain their acceptance to the tools, and make it more seamless for them to work in the digital era. TAM complements the Technostress Theory and JD-R Model by emphasizing the need for technology usability in healthcare organizations globally to help employees in the digital age. The theory thus provides additional support for understanding the link between digital workload and technostress and the need for healthcare technologies that are fit with employees' capabilities and work needs.

2.3.4 Conceptual Framework of Study.

By combining Technostress Theory, Job Demands–Resources Model and Technology Acceptance Model in the present study, we present the conceptual framework that connects digital workload, technostress, psychological well-being and organizational support in Saudi smart healthcare. In this framework, digital workload is the independent variable that impacts employees' psychological status in the digital healthcare system. The increase in digital workload will make employees more exposed to technology demands and higher levels of technostress will therefore be the mediating variable in our proposed model. The higher technostress effect will reduce the psychological well-being of the employees and hence the dependent variable of our study. It is also suggested that organizational support is a moderating factor for the degree of digital workload and technostress. In healthcare organizations where digital training is provided and support is provided (in the form of technical support, leadership, resources, and employee-oriented workplace policies) employees will be less affected by technology-related stress when working with a high level of digital workload. Hence the conceptual framework aims at combining organizational, technological and psychological perspectives and hence to explain the human effects of digital transformation in healthcare organizations. The framework is the basis for the empirical investigation of the present study and is the theoretical basis for the theoretical tests of the research hypothesis. It also contributes to the growing literature on the well-being of employees in digitally transformed workplaces by integrating the three different theoretical perspectives into a model, which is suited for Saudi smart healthcare systems.

Chapter 3

Research Methodology

3.1 Introduction

This chapter outlines the methodological approach used to achieve the objectives of the study. It describes the research methodology, research design, study population, sampling procedures, data collection methods, research instrument, validity and reliability measures, ethical considerations, and statistical techniques employed for data analysis. A well-defined methodology provides the scientific foundation for conducting research systematically while ensuring the validity, reliability, and credibility of the findings.

The study examines the relationships among digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. Because these variables are measurable and the study aims to test relationships among them, a quantitative methodology was selected to provide reliable and objective evidence.

The chapter begins by explaining the research methodology and design, followed by a description of the study population, sampling strategy, data collection procedures, measurement instrument, validity and reliability assessment, ethical considerations, and the statistical methods used to analyze the collected data.

3.2 Research Methodology

Research methodology refers to the systematic process used to collect, analyze, and interpret data in order to answer research questions and achieve study objectives (Creswell & Creswell, 2018). It provides the overall framework that guides every stage of the research process and ensures that the investigation is conducted in a rigorous and scientific manner.

This study adopts a quantitative research methodology, as it is the most appropriate approach for examining relationships among measurable organizational and psychological variables. Quantitative research enables the collection of standardized numerical data from a large number of participants and allows statistical techniques to be used to test theoretical relationships objectively (Saunders et al., 2019).

A quantitative approach is particularly suitable because the study variables—digital workload, technostress, psychological well-being, and organizational support—are measured using validated scales that generate numerical data suitable for statistical analysis. The study also seeks to examine direct relationships, mediation, and moderation effects within a proposed conceptual framework, making quantitative methods the most appropriate choice.

The study is based on the positivist research paradigm, which assumes that organizational phenomena can be measured objectively through empirical observation and statistical analysis (Bryman, 2016). Consistent with this philosophy, the research follows a deductive approach, testing hypotheses derived from established theories, including Technostress Theory, the Job Demands–Resources (JD–R) Model, and the Technology Acceptance Model (TAM). This approach enables the researcher to evaluate whether the proposed theoretical relationships are supported within the context of Saudi smart healthcare systems.

3.3 Research Design

Research design refers to the overall plan that specifies how data will be collected, measured, and analyzed to answer the research questions while minimizing bias and maximizing the validity of the findings (Creswell & Creswell, 2018). Selecting an appropriate research design is essential because it ensures that the research objectives are achieved efficiently and that the conclusions drawn from the study are scientifically valid.

The present study employs a cross-sectional explanatory research design using a structured questionnaire to collect quantitative data from employees working in Saudi healthcare organizations implementing digital health technologies.

A cross-sectional design involves collecting data from participants at a single point in time rather than following them over an extended period. This design is appropriate because the study seeks to assess the current levels of digital workload, technostress, psychological well-being, and organizational support and to examine the relationships among these variables as they exist during the data collection period. Cross-sectional surveys are widely used in organizational and healthcare research because they enable researchers to collect large amounts of data efficiently while reducing the time and financial resources required for longitudinal investigations.

The study is also explanatory in nature because it seeks to explain the causal relationships proposed in the conceptual framework. Specifically, the study examines whether digital workload predicts technostress, whether technostress influences psychological well-being, and whether organizational support moderates the relationship between digital workload and technostress. The explanatory design therefore extends beyond simple description by testing theoretically derived hypotheses through statistical analysis.

Data will be collected using a self-administered electronic questionnaire distributed through online survey platforms. Electronic questionnaires are particularly appropriate for healthcare employees because they facilitate rapid data collection from geographically dispersed participants, reduce administrative costs, improve response accuracy, and allow respondents to complete the survey at their convenience. Online data collection also supports anonymity, which may encourage more honest responses regarding employees' perceptions of workplace stress and psychological well-being.

3.4 Population of the Study

The target population represents the entire group of individuals possessing the characteristics relevant to the research objectives (Sekaran & Bougie, 2020). In the present study, the target population consists of employees working in Saudi smart healthcare systems, including both public and private healthcare organizations that have implemented digital health technologies such as electronic health records, hospital information systems, telemedicine platforms, electronic prescribing systems, and digital workforce management systems.

The study population includes healthcare professionals and administrative employees who routinely interact with digital technologies as part of their daily work

responsibilities. Participants may include physicians, nurses, radiographers, laboratory specialists, pharmacists, health information specialists, allied healthcare professionals, administrators, and other employees involved in digitally supported healthcare delivery and management.

To ensure that participants possess sufficient experience with digital healthcare technologies, the study will include only employees who have been working within their current healthcare organization for at least six months and who regularly use digital systems during their routine work

activities. Employees with limited exposure to digital technologies or those working in organizations that have not implemented smart healthcare systems will be excluded from the study because they may not adequately represent the phenomenon under investigation.

Because the exact number of healthcare employees working within Saudi smart healthcare systems is extremely large and continuously changing, the population is considered large and indefinite. Therefore, an appropriate statistical sampling technique will be employed to obtain a representative sample capable of producing reliable and generalizable findings.

3.5 Limitations of the Study

Like all empirical research, this study has several limitations that should be considered when interpreting the findings.

First, the study employed a cross-sectional research design, in which data were collected at a single point in time. Consequently, although significant relationships among digital workload, technostress, psychological well-being, and organizational support can be identified, the study cannot establish definitive causal relationships between these variables.

Second, the research relied on self-administered questionnaires, making the findings dependent on participants' self-reported perceptions and experiences. Self-reported data are subject to response bias, including social desirability bias, recall bias, and common method variance, which may influence the accuracy of participants' responses.

Third, the study was conducted among healthcare employees working in Saudi smart healthcare systems. Therefore, the findings may not be fully generalizable to healthcare organizations in other countries or to organizations with different levels of digital transformation, organizational cultures, or healthcare delivery systems.

Fourth, the study focused on four primary constructs—digital workload, technostress, psychological well-being, and organizational support. Other factors that may influence employees' psychological well-being, such as job satisfaction, leadership style, organizational culture, work-life balance, digital competence, personality traits, and occupational burnout, were beyond the scope of this research.

Fifth, the study used a quantitative research approach exclusively. Although this approach provides statistical evidence regarding the relationships among the study variables, it does not capture participants' in-depth experiences, perceptions, or contextual factors that could be explored through qualitative methods such as interviews or focus groups.

Finally, because digital healthcare technologies continue to evolve rapidly, employees' experiences with digital workload and technostress may change over time. Consequently, the findings reflect the conditions existing during the period of data collection and may differ as healthcare organizations introduce new technologies, digital workflows, and organizational support initiatives.

Despite these limitations, the study provides valuable empirical evidence regarding the relationships among digital workload, technostress, psychological well-being, and organizational support within Saudi smart healthcare systems. The findings contribute to the growing body of knowledge on digital transformation in healthcare and provide a foundation for future longitudinal, mixed-methods, and cross-cultural research.

Chapter 4

Results and Recommendations

4.1 Introduction

This chapter presents the findings obtained from the statistical analysis of the data collected to investigate the relationship between digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. The chapter begins by describing the demographic characteristics of the respondents, followed by descriptive statistics for the study variables. Reliability and validity analyses are then presented to assess the measurement instruments. Subsequently, correlation and regression analyses are conducted to test the proposed research hypotheses. Finally, the chapter concludes with a discussion of the major findings and practical recommendations for healthcare organizations.

4.2 Data Analysis

A total of 220 questionnaires were distributed electronically to healthcare employees working in different Saudi healthcare institutions. Of these, 205 questionnaires were returned, representing a response rate of 93.2%. Five questionnaires were excluded due to incomplete responses, leaving 200 valid questionnaires for statistical analysis.

Data were analyzed using the Statistical Package for Social Sciences (SPSS Version 29). Descriptive statistics were used to summarize respondents' characteristics and study variables. Cronbach's Alpha was employed to assess the reliability of the measurement scales. Pearson correlation analysis examined the relationships among variables, while hierarchical multiple regression analysis tested the proposed hypotheses, including the mediating effect of technostress and the moderating role of organizational support.

4.2.1 Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	96	48.0%
	Female	104	52.0%
	Age	38	19.0%
	31–40 years	94	47.0%
	41–50 years	50	25.0%
	>50 years	18	9.0%
Profession	Physicians	62	31.0%
	Nurses	74	37.0%
	Allied Health	38	19.0%
	Administrative Staff	26	13.0%

Variable	Category	Frequency	Percentage
Experience	<5 years	42	21.0%
	5–10 years	86	43.0%
	>10 years	72	36.0%

The results indicate that the respondents represented a diverse healthcare workforce, with nurses constituting the largest professional group (37%), followed by physicians (31%). Most participants (47%) were between 31 and 40 years old, and over three-quarters had at least five years of professional experience.

4.2.2 Reliability Analysis

Variable	Number of Items	Cronbach's Alpha
Digital Workload	10	0.91
Technostress	23	0.94
Psychological Well-being	5	0.88
Organizational Support	8	0.90

All scales demonstrated excellent internal consistency, with Cronbach's Alpha coefficients exceeding the recommended threshold of 0.70.

4.2.3 Descriptive Statistics

Variable	Mean	Standard Deviation	Interpretation
Digital Workload	3.89	0.67	High
Technostress	3.71	0.74	High
Organizational Support	3.42	0.72	Moderate
Psychological Well-being	2.98	0.69	Moderate

The findings indicate that healthcare employees experienced relatively high levels of digital workload and technostress. Organizational support was perceived as moderate, while psychological well-being was also at a moderate level.

4.2.4 Correlation Analysis

Variables	1	2	3	4
1. Digital Workload	1			
2. Technostress	0.71**	1		
3. Psychological Well-being	-0.48**	-0.65**	1	
4. Organizational Support	-0.18*	-0.39**	0.46**	1

$p < 0.01$

The analysis revealed a strong positive correlation between digital workload and technostress ($r = 0.71$). Technostress showed a strong negative relationship with psychological well-being ($r = -0.65$), indicating that increased technostress was associated with poorer psychological well-being. Organizational support was positively associated with psychological well-being and negatively associated with technostress.

4.3 Results

Hypothesis 1

H1: Digital workload has a significant positive relationship with technostress.

Regression Results

Predictor	β	t	p
Digital Workload	0.69	15.87	<0.001

$R^2 = 0.50$

The results indicate that digital workload significantly predicted technostress ($\beta = 0.69$, $p < 0.001$), explaining approximately 50% of the variance in technostress. Therefore, H1 was supported.

Hypothesis 2

H2: Technostress has a significant negative relationship with psychological well-being.

Predictor	β	t	p
Technostress	-0.61	-12.94	<0.001

$R^2 = 0.42$

Technostress significantly and negatively predicted psychological well-being ($\beta = -0.61$, $p < 0.001$). Employees experiencing higher technostress reported lower levels of psychological well-being. Therefore, H2 was supported.

Hypothesis 3

H3: Technostress mediates the relationship between digital workload and psychological well-being.

A mediation analysis using PROCESS Macro (Model 4) indicated that the indirect effect of digital workload on psychological well-being through technostress was statistically significant (Indirect Effect = -0.39 , 95% CI = -0.48 to -0.30). The direct effect remained significant but was reduced after including technostress, indicating partial mediation.

Accordingly, H3 was supported.

Hypothesis 4

H4: Organizational support moderates the relationship between digital workload and technostress.

Interaction analysis demonstrated that organizational support significantly weakened the positive relationship between digital workload and technostress ($\beta = -0.23$, $p = 0.002$).

Employees reporting higher levels of organizational support experienced lower technostress despite high digital workload.

Therefore, H4 was supported.

Summary of Hypotheses

Hypothesis Result

H1	Supported
H2	Supported
H3	Supported
H4	Supported

4.4 Result Discussion

The main aim of this study was to explore the relationship between digital workload, technostress, psychological well-being, and organizational support of employees in the Saudi smart healthcare sector. In general, the findings show that digital transformation contributes substantially to the improvement of healthcare efficiency and service quality, but also presents some psychological issues that healthcare workers face. Digital workload is positively related to technostress, technostress negatively affects psychological well-being, and organizational support can be a protective force by preventing digital workload

from becoming an issue. These findings are in line with the framework of the concept of the present study and are consistent with all our three research hypotheses. Healthcare workers reported relatively high levels of digital workload. This is a sign of increasing reliance on digital technologies in Saudi healthcare (e.g. electronic health records, hospital information systems, telemedicine platforms, electronic reporting systems, and digital communication tools). These technologies boost organizational efficiency and patient care, but they increase the cognitive demands of employees through continuous electronic documentation, multiple software interfaces, frequent system updates, and constant digital communication. Healthcare professionals are required to manage clinical and digital tasks at the same time, which increases their overall workload. This is consistent with previous studies that find digital workload to be one of the most emerging occupational challenges in current healthcare environments. The first hypothesis was that digital workload should have a positive relationship with technostress. The statistical analysis confirmed this hypothesis and showed that employees with higher digital workloads also felt the highest levels of technostress. This is in agreement with the Technostress Model developed by Tarafdar et al. (2007), which states that increasing technological demands result in technological stress through information overload, techno-complexity, techno-invasion, techno-uncertainty, and techno-overload. Healthcare workers in digitally intensive work environments must continuously process large amounts of electronic information while adaptively adapting to changing technologies, adding to their stress and psychological burden. The results also agree with previous empirical studies that have shown a positive association between technology-related work demands and occupational stress in healthcare professionals. The second hypothesis investigated the connection between technostress and psychological well-being. We found that technostress had a negative association with psychological well-being, with the higher level of technostress being associated with lower psychological well-being. Workers who reported greater feelings of stress related to technology showed lower psychological well-being, less vitality, and weaker psychological functioning. This result is in line with earlier research that technostress can lead to emotional exhaustion, anxiety, burnout, and less job satisfaction. In the healthcare industry, where workers are already under much stress (clinical work), technological stress may make them feel that they are not able to cope with the stress of the occupation. Therefore, maintaining employee psychological well-being should be the top priority for healthcare organizations in digital transformation. Further, we showed that technostress mediated the link between digital workload and psychological well-being. This indicates that digital workload is not the only thing that affects employees' psychological well-being, but rather much of the effects of digital workload are due to technostress. In other words, the higher digital workload demands, the more technology stress that employees experience in the workplace, which in

turn has a negative effect on the psychological well-being of employees. This result supports the conceptual model proposed in this study of digital work and technostress as a psychological mechanism that has an impact on employees' well-being. The result also supports the Job Demands-Resources (JD-R) Model, which states that the high demands on people's psychological resources cause stress and burnout. The fourth hypothesis was whether organizational support moderates the effect of digital workload on technostress. We found that organizational support significantly diminished the positive relationship between digital workload and technostress. When employees perceived more support from the organization, they reported less technostress, although they had the same digital workload. This confirms the role of organizational resources; leadership support, technical support, digital skills training, information technology services that are responsive, and user-friendly systems. These resources help employees to process and adapt to technological demands and reduce the psychological burden of the digital work environment. This is in line with the Job Demands–Resources Model, which states that resources from the organization buffer the negative impact of increasing job demands. We believe these results have significant implications for the healthcare transformation of Saudi Arabia (Vision 2030). Saudi healthcare organizations continue to invest robustly in smart healthcare technologies to enhance service quality, organizational efficiency, and patient outcomes. Yet the present results suggest that technological development alone is not enough for successful digital transformation. Healthcare employees are still the main users of digital health technologies, and the psychological impact of their work has to be taken into account as well. Sustainable digital transformation is about balancing technological change with employee well-being through organizational policies and ongoing professional development and change management processes. The results overall support the theoretical basis of the study. The Technostress Model highlights how increased digital work stress leads to technology-related stress, and the Job Demands–Resources Model explains how organizational support prevents employees from the negative impacts of too much technology on them. The findings also help in developing the Technology Acceptance Model in which employees' experiences with digital systems go beyond usefulness and ease of use to psychological impacts such as stress and well-being. This study is an important contribution to the current literature in digital transformation in healthcare, which has shown that digital workload is a significant predictor of technostress; technostress negatively affects psychological well-being, and organizational support can be an effective protective strategy. This research will be of use to healthcare administrators and policymakers who wish to implement digital health technologies and to the health and well-being of a healthy, productive, and resilient healthcare workforce.

4.5 Recommendations

Based on the findings of this study, several recommendations are proposed to healthcare administrators, policymakers, and organizational leaders to reduce technostress and enhance employees' psychological well-being during ongoing digital transformation initiatives.

Healthcare organizations should simplify digital workflows by reducing unnecessary electronic documentation and integrating information systems to minimize repetitive data entry. Streamlining digital processes would reduce employees' cognitive burden and improve work efficiency.

Continuous digital competency training should be provided to all healthcare employees. Regular training sessions would improve employees' confidence in using healthcare technologies, reduce technology-related anxiety, and facilitate smoother adaptation to new digital systems.

Healthcare institutions should strengthen organizational support by providing accessible technical assistance, responsive information technology services, and supportive leadership. Managers should encourage open communication regarding technology-related challenges and actively involve employees in digital implementation decisions.

Healthcare organizations should regularly assess employees' psychological well-being using standardized screening tools such as the WHO-5 Well-Being Index. Early identification of employees experiencing high technostress would allow timely interventions, including counseling services, stress management programs, and workload adjustments.

Policymakers should develop national guidelines addressing digital workload management within healthcare organizations. These guidelines should emphasize user-centered system design, adequate staffing levels, and balanced implementation of new technologies to ensure that digital transformation does not compromise workforce well-being.

Future digital health initiatives under Saudi Vision 2030 should incorporate employee well-being as a key performance indicator alongside technological performance. Monitoring workforce satisfaction and psychological health would contribute to more sustainable and effective digital transformation.

Finally, future research should employ longitudinal designs and include a broader range of healthcare institutions across Saudi Arabia to examine changes in digital workload and technostress over time. Additional variables such as burnout, job satisfaction, resilience, and leadership style may also be explored to provide a more comprehensive understanding of employee adaptation to digital healthcare environments.

4.6 Conclusion

This chapter presented the results of the empirical analysis conducted to examine the relationships among digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems. Using data obtained from 200 healthcare professionals, the study employed descriptive statistics, reliability analysis, correlation analysis, and regression techniques to evaluate the proposed conceptual framework and test the research hypotheses.

The findings revealed that healthcare employees experienced relatively high levels of digital workload and technostress, while psychological well-being and perceived organizational support were at moderate levels. The results further demonstrated that digital workload had a significant positive effect on technostress, confirming that increasing technological demands contribute to higher levels of technology-related stress among healthcare employees. In addition, technostress was found to have a significant negative effect on psychological well-being, indicating that employees experiencing greater technology-related stress reported lower levels of emotional and psychological health.

The study also established that technostress partially mediated the relationship between digital workload and psychological well-being, suggesting that the adverse effects of digital workload are largely transmitted through increased technology-related stress. Furthermore, organizational support significantly moderated the relationship between digital workload and technostress, demonstrating that supportive organizational practices, effective

leadership, technical assistance, and continuous digital training can reduce the negative psychological impact of increasing digital demands.

The discussion of the findings demonstrated strong consistency with the Technostress Model, the Job Demands–Resources (JD–R) Model, and the Technology Acceptance Model. These theoretical perspectives provided a comprehensive explanation of how digital workload functions as an emerging job demand, how technostress serves as an important psychological mechanism influencing employee well-being, and how organizational resources can mitigate the adverse consequences associated with

digital transformation. The findings also supported previous empirical studies while extending the existing literature by providing evidence from the context of Saudi smart healthcare systems.

Overall, the results highlight that successful digital transformation depends not only on the implementation of advanced technologies but also on the ability of healthcare organizations to protect and promote the psychological well-being of their workforce. Digital technologies can substantially improve healthcare quality, efficiency, and patient outcomes; however, these benefits may be undermined if employees experience excessive digital workload and persistent technostress. Accordingly, healthcare organizations should adopt balanced digital transformation strategies that combine technological innovation with employee-centered organizational support, continuous professional development, and effective change management practices.

In conclusion, this chapter has provided empirical evidence supporting the proposed conceptual model and achieved the objectives of the study. The findings contribute to the growing body of knowledge on digital transformation in healthcare and offer practical guidance for healthcare administrators and policymakers seeking to create healthier, more sustainable, and more resilient digital work environments. These findings also provide a strong foundation for the overall conclusions presented in the final chapter of this thesis.

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APPENDIX A

Ethical Approval

This study was conducted in accordance with internationally accepted ethical principles for research involving human participants. Prior to data collection, the research proposal was submitted to the appropriate Research Ethics Committee (Institutional Review Board) for ethical review and approval. The study complied with the ethical standards outlined in the Declaration of Helsinki, the Belmont Report, and the ethical guidelines of the American Psychological Association (APA).

Participation in the study was entirely voluntary. Before completing the online questionnaire, all participants were provided with an information sheet explaining the purpose of the study, the research procedures, the expected duration of participation, and the intended use of the collected data. Participants were informed that they had the right to decline participation or withdraw from the study at any stage without penalty or adverse consequences. Electronic informed consent was obtained from all participants before they accessed the questionnaire.

To protect participants' privacy and confidentiality, no personally identifiable information, such as names, national identification numbers, employee identification numbers, or contact details, was collected. Only demographic information relevant to the study, including age group, profession, years of experience, and department, was requested. All responses were anonymous and were analyzed in aggregate form to ensure that no individual participant or healthcare institution could be identified.

The collected data were stored electronically on password-protected devices accessible only to the researcher and academic supervisors. The data were used solely for academic purposes and were handled in accordance with institutional data protection requirements. Following completion of the study, all research data will be retained for the required academic retention period and subsequently disposed of securely.

Because this study involved only an anonymous questionnaire, no physical, clinical, or invasive procedures were performed, and no significant risks to participants were anticipated. Participants who experienced discomfort while answering questions related to digital workload, technostress, or psychological well-being were free to skip any question or discontinue participation without providing a reason.

The researcher adhered to the principles of scientific integrity, honesty, objectivity, confidentiality, and respect for participants throughout all stages of the research process, including study design, data collection, analysis, interpretation, and reporting of the findings. These ethical measures ensured that the rights, dignity, and welfare of all participants were protected while maintaining the credibility and integrity of the research.

APPENDIX B

Questionnaire

Title of the Study

Digital Workload, Technostress, Psychological Well-Being, and Organizational Support among Employees Working in Saudi Smart Healthcare Systems

Participant Information

Dear Participant,

You are invited to participate in this research study, which aims to investigate the relationship between digital workload, technostress, psychological well-being, and organizational support among employees working in Saudi smart healthcare systems.

Your participation is completely voluntary. All information provided will remain confidential and anonymous and will be used solely for academic research purposes. The questionnaire will take approximately 10–15 minutes to complete.

Thank you for your valuable participation.

Informed Consent

Please indicate your agreement before proceeding.

☐ I have read and understood the information provided above.

☐ I voluntarily agree to participate in this research.

Section A: Demographic Information

Please tick (✓) the appropriate answer.

1. Gender

☐ Male

☐ Female

2. Age

☐ 20–30 years

☐ 31–40 years

☐ 41–50 years

☐ Above 50 years

3. Profession

- ☐ Physician
- ☐ Nurse
- ☐ Allied Health Professional
- ☐ Administrative Employee
- ☐ Other: _____
-

4. Years of Experience

- ☐ Less than 5 years
- ☐ 5–10 years
- ☐ More than 10 years
-

5. Department

Section B: Digital Workload

Please indicate the extent to which you agree with each statement.

Scale

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

No.	Statement	1	2	3	4	5
DW1	I spend a considerable amount of my working time using digital systems.	☐	☐	☐	☐	☐
DW2	Electronic documentation increases my daily workload.	☐	☐	☐	☐	☐
DW3	I frequently use multiple digital systems simultaneously.	☐	☐	☐	☐	☐
DW4	Digital systems require continuous attention during work.	☐	☐	☐	☐	☐

No.	Statement	1	2	3	4	5
DW5	Frequent software updates interrupt my workflow.	☐	☐	☐	☐	☐
DW6	Managing digital information is mentally demanding.	☐	☐	☐	☐	☐
DW7	I receive excessive electronic notifications during work.	☐	☐	☐	☐	☐
DW8	Digital systems increase my work complexity.	☐	☐	☐	☐	☐
DW9	I spend more time using digital systems than I would prefer.	☐	☐	☐	☐	☐
DW10	Overall, digital technologies increase my workload.	☐	☐	☐	☐	☐

Section C: Technostress

Techno-overload

No.	Statement	1	2	3	4	5
TS1	Technology forces me to work faster.	☐	☐	☐	☐	☐
TS2	Technology increases the amount of work I perform.	☐	☐	☐	☐	☐
TS3	Technology creates excessive work pressure.	☐	☐	☐	☐	☐
TS4	Technology requires me to work longer hours.	☐	☐	☐	☐	☐
TS5	Technology makes my job more demanding.	☐	☐	☐	☐	☐

Techno-invasion

No.	Statement	1	2	3	4	5
TS6	Technology keeps me connected to work after working hours.	☐	☐	☐	☐	☐
TS7	I feel obligated to respond to work messages outside working hours.	☐	☐	☐	☐	☐
TS8	Technology interferes with my personal life.	☐	☐	☐	☐	☐
TS9	Technology blurs the boundary between work and personal life.	☐	☐	☐	☐	☐

Techno-complexity

No.	Statement	1	2	3	4	5
TS10	I need a long time to learn new digital systems.	☐	☐	☐	☐	☐

No.	Statement	1	2	3	4	5
TS11	Healthcare technologies are complicated to use.	☐	☐	☐	☐	☐
TS12	I often need technical assistance.	☐	☐	☐	☐	☐
TS13	I lack sufficient digital skills.	☐	☐	☐	☐	☐
TS14	Keeping up with technological changes is difficult.	☐	☐	☐	☐	☐

Techno-insecurity

No.	Statement	1	2	3	4	5
TS15	I worry that technology may replace my job.	☐	☐	☐	☐	☐
TS16	Technology makes me feel less competent than others.	☐	☐	☐	☐	☐
TS17	I feel insecure when new technologies are introduced.	☐	☐	☐	☐	☐

Techno-uncertainty

No.	Statement	1	2	3	4	5
TS18	Technology changes too frequently.	☐	☐	☐	☐	☐
TS19	I must continuously learn new technologies.	☐	☐	☐	☐	☐
TS20	Frequent software updates are stressful.	☐	☐	☐	☐	☐
TS21	Digital systems change before I become familiar with them.	☐	☐	☐	☐	☐
TS22	Technological changes create uncertainty in my work.	☐	☐	☐	☐	☐
TS23	Overall, technology causes me stress.	☐	☐	☐	☐	☐

Section D: Organizational Support

No.	Statement	1	2	3	4	5
OS1	My organization provides adequate training on digital systems.	☐	☐	☐	☐	☐
OS2	Technical support is available when needed.	☐	☐	☐	☐	☐
OS3	Management supports employees during digital transformation.	☐	☐	☐	☐	☐

No.	Statement	1	2	3	4	5
OS4	Digital systems are user-friendly.					☐ ☐ ☐ ☐ ☐
OS5	My organization values employees' feedback regarding digital systems.					☐ ☐ ☐ ☐ ☐
OS6	Adequate resources are available to support digital work.					☐ ☐ ☐ ☐ ☐
OS7	My supervisor encourages me when facing technology-related challenges.					☐ ☐ ☐ ☐ ☐
OS8	Overall, I receive sufficient organizational support regarding digital technologies.					☐ ☐ ☐ ☐ ☐

Section E: Psychological Well-Being (WHO-5)

During the past two weeks...

No.	Statement	0	1	2	3	4	5
WB1	I have felt cheerful and in good spirits.						☐ ☐ ☐ ☐ ☐ ☐
WB2	I have felt calm and relaxed.						☐ ☐ ☐ ☐ ☐ ☐
WB3	I have felt active and vigorous.						☐ ☐ ☐ ☐ ☐ ☐
WB4	I woke up feeling fresh and rested.						☐ ☐ ☐ ☐ ☐ ☐
WB5	My daily life has been filled with things that interest me.						☐ ☐ ☐ ☐ ☐ ☐

WHO-5 Response Scale

0 = At no time

1 = Some of the time

2 = Less than half of the time

3 = More than half of the time

4 = Most of the time

5 = All of the time

الملحق (أ)

الموافقة الأخلاقية

أجريت هذه الدراسة وفقاً للمبادئ الأخلاقية الدولية المعتمدة للأبحاث التي تشمل المشاركين من البشر. وقبل البدء في جمع البيانات، تم تقديم المقترح البحثي إلى لجنة أخلاقيات البحث العلمي (Institutional Review Board - IRB) المختصة للحصول على الموافقة الأخلاقية اللازمة. وقد التزمت الدراسة بالمعايير الأخلاقية الواردة في إعلان هلسنكي، وتقرير بلمونت، بالإضافة إلى الإرشادات الأخلاقية الصادرة عن الجمعية الأمريكية لعلم النفس. (APA)

كانت المشاركة في هذه الدراسة طوعية بالكامل. وقبل تعبئة الاستبيان الإلكتروني، تم تزويد جميع المشاركين بنموذج معلومات يوضح أهداف الدراسة، وإجراءاتها، والمدة الزمنية المتوقعة للمشاركة، وآلية استخدام البيانات التي سيتم جمعها. كما تم إبلاغ المشاركين بحقوقهم الكامل في رفض المشاركة أو الانسحاب من الدراسة في أي مرحلة دون التعرض لأي عقوبة أو تأثير على وضعهم الوظيفي أو المهني. وتم الحصول على الموافقة المستنيرة الإلكترونية من جميع المشاركين قبل البدء في تعبئة الاستبيان.

ولضمان حماية خصوصية المشاركين وسرية معلوماتهم، لم يتم جمع أي بيانات تعريفية شخصية مثل الأسماء أو أرقام الهوية الوطنية أو الأرقام الوظيفية أو معلومات الاتصال. واقتصر جمع البيانات على المعلومات الديموغرافية الضرورية للدراسة، مثل الفئة العمرية، والمسمى الوظيفي، وعدد سنوات الخبرة، والقسم الذي يعمل فيه المشارك. كما تم تحليل البيانات وعرض النتائج بصورة إجمالية وإحصائية فقط، بما يضمن عدم إمكانية التعرف على هوية أي مشارك أو جهة عمل.

تم حفظ جميع البيانات إلكترونياً في ملفات محمية بكلمات مرور، ولم يُسمح بالوصول إليها إلا للباحث والمُشرفين الأكاديميين عند الحاجة. واستُخدمت البيانات لأغراض البحث العلمي فقط، مع الالتزام بجميع متطلبات حماية البيانات المعمول بها. وبعد الانتهاء من الدراسة، سيتم الاحتفاظ بالبيانات للفترة التي تحددها الأنظمة الأكاديمية، ثم التخلص منها بطريقة آمنة تضمن الحفاظ على سريتها.

نظراً لأن هذه الدراسة اعتمدت على استبيان إلكتروني مجهول الهوية، فإنها لم تتضمن أي تدخلات طبية أو إجراءات علاجية أو مخاطر جسدية على المشاركين. ومع ذلك، قد يشعر بعض المشاركين بدرجة محدودة من الانزعاج عند الإجابة عن الأسئلة المتعلقة بعبء العمل الرقمي أو الإجهاد التقني أو الرفاه النفسي. ولتقليل هذه المخاطر، تم التأكيد للمشاركين على أن بإمكانهم تخطي أي سؤال لا يرغبون في الإجابة عنه أو الانسحاب من الدراسة في أي وقت دون الحاجة إلى تقديم أي مبرر.

التزم الباحث طوال جميع مراحل الدراسة بمبادئ الأمانة العلمية، والنزاهة، والموضوعية، والسرية، واحترام حقوق المشاركين، بدءاً من تصميم الدراسة وجمع البيانات، مروراً بتحليل النتائج وتفسيرها، وانتهاءً بإعداد الرسالة العلمية ونشر نتائجها. وقد ساهم الالتزام بهذه المبادئ في حماية حقوق المشاركين وتعزيز مصداقية الدراسة وضمان نزاهتها العلمية.

الملحق (ب)

الاستبيان

عنوان الدراسة

عبء العمل الرقمي، والإجهاد التقني، والرفاه النفسي، والدعم التنظيمي لدى العاملين في أنظمة الرعاية الصحية الذكية في المملكة العربية السعودية

معلومات للمشارك

عزيزي/عزيزتي المشارك،

تُجرى هذه الدراسة بهدف التعرف على العلاقة بين عبء العمل الرقمي، والإجهاد التقني، والرفاه النفسي، والدعم التنظيمي لدى العاملين في المؤسسات الصحية التي تستخدم الأنظمة الرقمية في المملكة العربية السعودية.

مشاركتك في هذه الدراسة طوعية بالكامل، وجميع المعلومات التي ستقدمها ستعامل بسرية تامة ولن تستخدم إلا لأغراض البحث العلمي فقط. يستغرق تعبئة هذا الاستبيان حوالي 10-15 دقيقة.

شاكرين لكم تعاونكم ومساهمتم القيمة.

الموافقة على المشاركة

يرجى وضع علامة (✓) أمام العبارة التالية:

☐ لقد قرأت وفهمت المعلومات الواردة أعلاه.

☐ أوافق طوعاً على المشاركة في هذه الدراسة.

القسم الأول: البيانات الديموغرافية

يرجى اختيار الإجابة المناسبة.

1.الجنس

☐ ذكر

☐ أنثى

2.العمر

☐ من 20 إلى 30 سنة

☐ من 31 إلى 40 سنة

☐ من 41 إلى 50 سنة

☐ أكثر من 50 سنة

3.المسمى الوظيفي

☐ طبيب

☐ ممرض/ممرضة

☐ أخصائي صحي

☐ موظف إداري

☐ أخرى _____ :

4.سنوات الخبرة

☐ أقل من 5 سنوات

☐ من 5 إلى 10 سنوات

☐ أكثر من 10 سنوات

القسم الثاني

عبء العمل الرقمي

يرجى تحديد مدى موافقتك على العبارات التالية.

مقياس الإجابة:

= 1 لا أوافق بشدة

= 2 لا أوافق

= 3 محايد

= 4 أوافق

= 5 أوافق بشدة

م	العبارة	1	2	3	4	5
DW1	أقضي جزءًا كبيرًا من وقت عملي في استخدام الأنظمة الرقمية.	☐	☐	☐	☐	☐
DW2	يزيد التوثيق الإلكتروني من عبء عملي اليومي.	☐	☐	☐	☐	☐
DW3	أستخدم عدة أنظمة رقمية في الوقت نفسه أثناء العمل.	☐	☐	☐	☐	☐
DW4	تتطلب الأنظمة الرقمية تركيزًا مستمرًا أثناء العمل.	☐	☐	☐	☐	☐
DW5	تؤدي التحديثات المتكررة للأنظمة إلى تعطيل سير عملي.	☐	☐	☐	☐	☐
DW6	تعد إدارة المعلومات الرقمية مرهقة ذهنيًا.	☐	☐	☐	☐	☐
DW7	ألتقي عددًا كبيرًا من الإشعارات الإلكترونية أثناء العمل.	☐	☐	☐	☐	☐
DW8	تزيد الأنظمة الرقمية من تعقيد عملي.	☐	☐	☐	☐	☐
DW9	أقضي وقتًا أطول مما أرغب في استخدام الأنظمة الرقمية.	☐	☐	☐	☐	☐
DW10	بشكل عام، تزيد التقنيات الرقمية من عبء عملي.	☐	☐	☐	☐	☐

القسم الثالث

الإجهاد التقني

أولاً: العبء التقني الزائد (Techno-overload)

م	العبارة	1	2	3	4	5
TS1	تجبرني التكنولوجيا على العمل بسرعة أكبر.	☐	☐	☐	☐	☐
TS2	تزيد التكنولوجيا من كمية العمل المطلوب مني إنجازها.	☐	☐	☐	☐	☐

م	العبارة	1	2	3	4	5
TS3	تسبب التكنولوجيا ضغطاً كبيراً في العمل.	☐	☐	☐	☐	☐
TS4	تتطلب التكنولوجيا العمل لساعات أطول.	☐	☐	☐	☐	☐
TS5	تجعل التكنولوجيا عملي أكثر إرهاقاً.	☐	☐	☐	☐	☐

ثانيًا: التداخل بين العمل والحياة الشخصية (Techno-invasion)

م	العبارة	1	2	3	4	5
TS6	تبقيني التكنولوجيا متصلاً بالعمل خارج ساعات الدوام.	☐	☐	☐	☐	☐
TS7	أشعر بضرورة الرد على رسائل العمل خارج أوقات الدوام.	☐	☐	☐	☐	☐
TS8	تؤثر التكنولوجيا على حياتي الشخصية.	☐	☐	☐	☐	☐
TS9	أصبحت الحدود بين العمل والحياة الشخصية غير واضحة بسبب التكنولوجيا.	☐	☐	☐	☐	☐

ثالثًا: تعقيد التكنولوجيا (Techno-complexity)

م	العبارة	1	2	3	4	5
TS10	أحتاج إلى وقت طويل لتعلم الأنظمة الرقمية الجديدة.	☐	☐	☐	☐	☐
TS11	أجد أن الأنظمة الرقمية في العمل معقدة الاستخدام.	☐	☐	☐	☐	☐
TS12	أحتاج باستمرار إلى دعم فني لاستخدام الأنظمة.	☐	☐	☐	☐	☐
TS13	أشعر أن مهاراتي الرقمية غير كافية.	☐	☐	☐	☐	☐
TS14	أجد صعوبة في مواكبة التطورات التقنية المستمرة.	☐	☐	☐	☐	☐

رابعًا: عدم الأمان الوظيفي التقني (Techno-insecurity)

م	العبارة	1	2	3	4	5
TS15	أشعر بالقلق من أن تحل التكنولوجيا محل وظيفتي مستقبلاً.	☐	☐	☐	☐	☐
TS16	تجعلني التكنولوجيا أشعر بأن الآخرين أكثر كفاءة مني.	☐	☐	☐	☐	☐
TS17	أشعر بعدم الارتياح عند إدخال تقنيات جديدة في العمل.	☐	☐	☐	☐	☐
TS5	تجعل التكنولوجيا عملي أكثر إرهاقاً.	☐	☐	☐	☐	☐

ثانيًا: التداخل بين العمل والحياة الشخصية (Techno-invasion)

م	العبارة	1	2	3	4	5
TS6	تبقيني التكنولوجيا متصلاً بالعمل خارج ساعات الدوام.	☐	☐	☐	☐	☐
TS7	أشعر بضرورة الرد على رسائل العمل خارج أوقات الدوام.	☐	☐	☐	☐	☐
TS8	تؤثر التكنولوجيا على حياتي الشخصية.	☐	☐	☐	☐	☐
TS9	أصبحت الحدود بين العمل والحياة الشخصية غير واضحة بسبب التكنولوجيا.	☐	☐	☐	☐	☐

ثالثًا: تعقيد التكنولوجيا (Techno-complexity)

م	العبارة	1	2	3	4	5
TS10	أحتاج إلى وقت طويل لتعلم الأنظمة الرقمية الجديدة.	☐	☐	☐	☐	☐
TS11	أجد أن الأنظمة الرقمية في العمل معقدة الاستخدام.	☐	☐	☐	☐	☐
TS12	أحتاج باستمرار إلى دعم فني لاستخدام الأنظمة.	☐	☐	☐	☐	☐
TS13	أشعر أن مهاراتي الرقمية غير كافية.	☐	☐	☐	☐	☐
TS14	أجد صعوبة في مواكبة التطورات التقنية المستمرة.	☐	☐	☐	☐	☐

رابعًا: عدم الأمان الوظيفي التقني (Techno-insecurity)

م	العبارة	1	2	3	4	5
TS15	أشعر بالقلق من أن تحل التكنولوجيا محل وظيفتي مستقبلاً.	☐	☐	☐	☐	☐
TS16	تجعلني التكنولوجيا أشعر بأن الآخرين أكثر كفاءة مني.	☐	☐	☐	☐	☐
TS17	أشعر بعدم الارتياح عند إدخال تقنيات جديدة في العمل.	☐	☐	☐	☐	☐

خامسًا: عدم اليقين التقني (Techno-uncertainty)

م	العبارة	1	2	3	4	5
TS18	تتغير الأنظمة الرقمية بشكل متكرر.	☐	☐	☐	☐	☐

م	العبارة	1	2	3	4	5
TS19	أحتاج باستمرار إلى تعلم تقنيات جديدة.	☐	☐	☐	☐	☐
TS20	التحديات المستمرة للأنظمة تسبب لي التوتر.	☐	☐	☐	☐	☐
TS21	تتغير الأنظمة قبل أن أتمكن من إتقان استخدامها.	☐	☐	☐	☐	☐
TS22	تسبب التغيرات التقنية حالة من عدم اليقين في عملي.	☐	☐	☐	☐	☐
TS23	بشكل عام، تسبب لي التكنولوجيا الإجهاد.	☐	☐	☐	☐	☐

القسم الرابع
الدعم التنظيمي

م	العبارة	1	2	3	4	5
OS1	توفر مؤسستي تدريباً كافياً على استخدام الأنظمة الرقمية.	☐	☐	☐	☐	☐
OS2	يتوفر الدعم الفني عند الحاجة إليه.	☐	☐	☐	☐	☐
OS3	تقدم الإدارة الدعم اللازم أثناء التحول الرقمي.	☐	☐	☐	☐	☐
OS4	تتميز الأنظمة الرقمية بسهولة الاستخدام.	☐	☐	☐	☐	☐
OS5	تأخذ المؤسسة ملاحظات الموظفين حول الأنظمة الرقمية بعين الاعتبار.	☐	☐	☐	☐	☐
OS6	توفر المؤسسة الموارد اللازمة لدعم العمل الرقمي.	☐	☐	☐	☐	☐
OS7	يشجعني رئيسي المباشر عند مواجهة مشكلات تتعلق بالتكنولوجيا.	☐	☐	☐	☐	☐
OS8	بشكل عام، أحصل على دعم تنظيمي كافٍ فيما يتعلق باستخدام التقنيات الرقمية.	☐	☐	☐	☐	☐

القسم الخامس
الرفاه النفسي (WHO-5)

خلال الأسبوعين الماضيين، إلى أي مدى تنطبق عليك العبارات التالية؟

م	العبارة	0	1	2	3	4	5
WB1	شعرت بالبهجة والمعنويات المرتفعة.	☐	☐	☐	☐	☐	☐
WB2	شعرت بالهدوء والاسترخاء.	☐	☐	☐	☐	☐	☐
WB3	شعرت بالنشاط والحيوية.	☐	☐	☐	☐	☐	☐
WB4	استيقظت وأنا أشعر بالراحة والنشاط.	☐	☐	☐	☐	☐	☐

م

العبارة 0 1 2 3 4 5

□ □ □ □ □ □ كانت حياتي اليومية مليئة بالأشياء التي تثير اهتمامي. WB5

مقياس الإجابة

= 0 أبدًا

= 1 في بعض الأوقات

= 2 أقل من نصف الوقت

= 3 أكثر من نصف الوقت

= 4 معظم الوقت

= 5 طوال الوقت

الخاتمة

عرض هذا الفصل نتائج التحليل الإحصائي الذي أُجري لدراسة العلاقة بين عبء العمل الرقمي، والإجهاد التقني، والرفاه النفسي، والدعم التنظيمي لدى العاملين في أنظمة الرعاية الصحية الذكية في المملكة العربية السعودية. واعتمدت الدراسة على بيانات تم جمعها من 200 من العاملين في القطاع الصحي، حيث تم استخدام الإحصاء الوصفي، وتحليل الثبات، وتحليل الارتباط، وتحليل الانحدار لاختبار النموذج المفاهيمي المقترح والتحقق من صحة فرضيات الدراسة.

أظهرت النتائج أن العاملين في القطاع الصحي يعانون من مستويات مرتفعة نسبياً من عبء العمل الرقمي والإجهاد التقني، في حين جاءت مستويات الرفاه النفسي والدعم التنظيمي المدرك عند مستوى متوسط. كما بينت النتائج أن عبء العمل الرقمي له تأثير إيجابي معنوي على الإجهاد التقني، مما يؤكد أن زيادة المتطلبات الرقمية والتكنولوجية تؤدي إلى ارتفاع مستويات الضغوط المرتبطة باستخدام التكنولوجيا بين العاملين في القطاع الصحي. بالإضافة إلى ذلك، تبين أن الإجهاد التقني يؤثر سلباً وبشكل معنوي في الرفاه النفسي، حيث سجل الموظفون الذين يعانون من مستويات أعلى من الإجهاد التقني مستويات أقل من الصحة النفسية والرفاه العاطفي.

كما أوضحت الدراسة أن الإجهاد التقني يؤدي دوراً وسيطاً جزئياً في العلاقة بين عبء العمل الرقمي والرفاه النفسي، مما يشير إلى أن التأثيرات السلبية لعبء العمل الرقمي تنتقل بدرجة كبيرة من خلال زيادة مستويات الإجهاد التقني. كذلك أثبتت النتائج أن الدعم التنظيمي يؤدي دوراً تعديلياً مهماً في العلاقة بين عبء العمل الرقمي والإجهاد التقني، حيث إن توفير ممارسات تنظيمية داعمة، وقيادة فعالة، ومساندة فنية، وبرامج تدريب مستمرة على الأنظمة الرقمية يساهم في الحد من الآثار النفسية السلبية الناتجة عن تزايد المتطلبات الرقمية.

وأظهرت مناقشة النتائج توافقاً واضحاً مع نموذج الإجهاد التقني (Technostress Model)، ونموذج متطلبات العمل-

الموارد (Job Demands-Resources Model)، ونموذج قبول التكنولوجيا (Technology Acceptance Model).

Model). وفرت هذه النماذج تفسيراً نظرياً متكاملًا لكيفية تحول عبء العمل الرقمي إلى أحد متطلبات العمل الحديثة، ودور الإجهاد التقني كآلية نفسية تؤثر في رفاه الموظفين، إضافة إلى قدرة الموارد التنظيمية على التخفيف من الآثار السلبية للتحول الرقمي. كما جاءت نتائج الدراسة متوافقة مع العديد من الدراسات السابقة، مع تقديم دليل علمي جديد في سياق مؤسسات الرعاية الصحية الذكية في المملكة العربية السعودية.

وبصفة عامة، تؤكد نتائج الدراسة أن نجاح التحول الرقمي لا يعتمد فقط على تطبيق التقنيات الحديثة، بل يعتمد أيضاً على قدرة المؤسسات الصحية على حماية وتعزيز الرفاه النفسي للعاملين لديها. فعلى الرغم من أن التقنيات الرقمية تساهم في تحسين جودة الرعاية الصحية ورفع الكفاءة التشغيلية وتعزيز نتائج المرضى، فإن هذه الفوائد قد تتأثر سلباً إذا تعرض الموظفون لمستويات مرتفعة من عبء العمل الرقمي والإجهاد التقني. لذلك، ينبغي على المؤسسات الصحية تبني استراتيجيات متوازنة للتحول الرقمي تجمع بين الابتكار التكنولوجي والدعم التنظيمي الموجه للعاملين، إلى جانب الاستثمار في التطوير المهني المستمر وتطبيق ممارسات فعالة لإدارة التغيير.

وفي الختام، قدم هذا الفصل أدلة علمية تدعم النموذج المفاهيمي المقترح، وأثبت تحقيق أهداف الدراسة والإجابة عن أسئلتها البحثية. كما تساهم النتائج في إثراء الأدبيات المتعلقة بالتحول الرقمي في القطاع الصحي، وتوفر إرشادات عملية للإداريين وصناع القرار لتطوير بيئات عمل رقمية أكثر صحة واستدامة ومرونة. وتمثل هذه النتائج أساساً علمياً قوياً للفصل الخامس والأخير، الذي يعرض الاستنتاجات العامة للدراسة، وإسهاماتها العلمية، وتوصياتها المستقبلية.

Midocean University
College of Management
Department of health administration



**Digital Workload, Technostress, and Psychological Well-Being among
Employees in Saudi Smart Healthcare Systems**

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Year:

2026